

THE
LANDS
OF THE
ENGLISH LAKE COUNTRY.



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THE ROYAL FERN.

THE FERNS OF THE ENGLISH LAKE COUNTRY: WITH TABLES OF VARIETIES.



BY
W. J. LINTON.

Third Edition.—EDITED BY G. WHITWELL

WINDERMERE: J. GARNETT.

1893

P R E F A C E .

For the general scientific part of this book I am indebted to the Editor of *Nature-printed Ferns* — Mr. Thomas Moore — whose various works upon British Ferns have exhausted nearly all that can be said upon the subject. On this ground my book could hardly be more than a mere abridgement and paraphrase of his writing. For new and original matter I have to thank Mr. F. Clowes of Windermere, who very kindly furnished me with the lists of local varieties, at the same time accorded me so much help and supervision as may, I trust, be sufficient guarantee for correctness. My obligations ought also to be expressed to Mr. Barnes and other collectors, from whom, through Mr. Clowes, I obtained information for these lists. The General Description and the Chapter on Meanings of Names and Terms have been added not only to give a more universal interest to the book, but as almost necessary for the collector or student, since nearly all the genera of British Ferns (sixteen out of nineteen) are found in the Lake Country. The engravings are from nature, and as many have been given as are wanted to show the character of genera and species, some few only have been omitted as not distinguishable in figures on so small a scale. The Remote Buckler Fern, introduced to the British Flora by Mr. Clowes, and first described in the Addenda to Mr. Moore's 8vo. edition of *Nature-printed British Ferns*, 1862, has, I believe, been engraved only once before now.

So much of Preface seemed right to explain the nature of the work and to render fitting acknowledgments and thanks.

I have only farther to say that I shall be obliged to any one who will favour me by either pointing out possible errors or giving me information as to new varieties or habitats.

W. J. LINTON.

BRANTWOOD, CONISTON,
SEPT., 1865.

THE SECOND EDITION.

In the absence from this country of the talented author of this volume, when the second edition was required, it became necessary to enquire for a competent editor. Mr. Barnes of Levens, (to whose fame as a fernist nothing can be added here) rendered great help to Mr. Linton in 1865, and now has, by the introduction of his elaborate and most valuable Tables of Varieties, put a finishing touch to the book which perhaps no other hand could have supplied. It will be appreciated by all concerned, and from me unbounded thanks are due. Not a little trouble has devolved upon collectors who have supplied Mr. Barnes with the results of their labours; and to all of them I am under great obligation.

J. G.

WINDERMERE,
13th APRIL, 1878.

THE THIRD EDITION.

Mr. Geo. Whitwell, of Kendal, has now made considerable additions to the Tables of Varieties, for which I record my best thanks.

J. G.

WINDERMERE,
6th FEB., 1893.

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F E R N S
OF THE ENGLISH LAKE COUNTRY.

The English Lake Country might not inappropriately be called The Land of Ferns, for there is no other part of the kingdom, perhaps, which affords greater facilities for their propagation and growth. The climate and soil are peculiarly adapted to their luxuriant development. The high average rain-fall of the district, and other circumstances, cause a more or less constant humidity of its atmosphere which is all-important to fern life. The temperature, so varied by elevation, shelter, and proximity to the sea, is admirably suited to the larger number of the British species. Such valleys as Windermere and many others besides, are protected by lofty mountains from the north and east winds, and being also influenced by the sea air, their mean winter temperature is rendered higher than that of many midland or even southern counties. Nor is it a less striking feature in the climate that severe droughts are seldom experienced : so much is this the case, that not un-

frequently the whole Lake District wears a dress of verdure and freshness when many other parts of England are parched and discoloured by long continued drought. The dry heat, which is so prejudicial to fern growth, is thus avoided here, and a moderately warm, but at the same time moist, temperature, such as most of the British species delight in, is obtained. On the mountains again we find that those climatal conditions prevail which are requisite for the demands of the alpine and sub-alpine species. And such Ferns as the rare *Woodsia ilvensis* and *Polystichum Lonchitis* have been found in several places; and even the still more rare *Asplenium germanicum*. Again, some rocks by the sea-side furnish a home for the Sea Spleenwort. It would be scarcely possible indeed to find anywhere more natural circumstances so happily blended together and combining to render the country an unexceptionable nursery for that tribe of plants which are consequently so abundant here, the Ferns. Ranges of lime stone mountains on the outskirts of our district produce in abundance the species peculiar to that formation. Slate, granite, and other rocks, rising to different heights and having different aspects, afford natural habitats for the numerous rupestral species, and those more delicate but graceful forms which are perhaps the most attractive of the Fern tribe and which revel in moisture and cool shade, have everything they can desire for their prosperity in the numerous peat bogs and the extensive leafy woods with which the district is so lavishly adorned. Of the forty-three species of

true Ferns indigenous in Great Britain, thirty-six are found in the Lake Country. One of these—*Lastrea remota*—has not hitherto been discovered in any other part of the British Isles.

Of the Fern Allies, all the Lycopodia, including the rare *Lycopodium annotinum* discovered in Langdale in 1851, by the Rev. R. Rolleston, many of the Equiseta and the *Isoetes lacustris* are found in appropriate localities. The latter, combined with the little *Littorella lacustris* (Shore Weed,) clothes the under surface of many of the Lakes with a perennial verdure. In whatever direction, therefore, the fern hunter may ramble, whether he explore the depths of the lakes, or track his way through the shady woods, or ascend the mountains, he will everywhere meet with objects of interest.

GENERAL DESCRIPTION.

IN the broad primary division of the great Vegetable Kingdom into FLOWERING and FLOWERLESS Plants, FERNS are placed at the head of the second class. Possessing a distinct stem and leaves (the latter named fronds, to distinguish them from the leaves of other plants), *they are without flowers, ordinarily so called*, and consequently cannot produce seeds in the ordinary flower-manner. They have also a special structure: for while the Flowering Plants are either EXOGENS—(plants whose stems consist of pith, wood, and bark, growing in concentric circles, and whose leaves have veins branching like net-work),—or ENDOGENS—plants without distinction of pith or bark, whose stems are merely confused pithy matter or woody fibrous thread-like bundles, and whose leaf-veins are parallel,—the Flowerless Plants, called ACROGENS, *have their wood disposed in a zigzag manner, and their leaves are either without veins, or with veins of the most simple character, scarcely branching at all, or branching only in repeated forks.* The greater outer distinction, however, is that of the absence of any ap-

parent flowers, and the arrangements of the seed (or *spores*) in seed-vessels (or *spore-cases*) upon the leaves themselves. This is speaking of the Ferns only, for other Acrogens (called also Cryptogamic Plants), such as the Fungi, have, or seem to have, no leaves at all.

These spore-cases are set in clusters called *sori* (in the singular *sorus*), looking like patches of brownish or greenish brown dust, round or oblong or in lines, upon the backs or margins of the fronds ; and, as no flowering-plant bears such, the full-grown Fern is easily distinguishable.

The spores — says Moore — ‘are minute, roundish, angular, or oblong vesicles, consisting of two outer layers, or coatings, enclosing a thickish granular fluid, and they are very numerous and arranged without order within the spore-cases. They are so small and dust-like that, when thinly scattered over a sheet of paper are scarcely visible to the naked eye, though lying by thousands amongst the also minute emptied spore-cases. The colour, no less than the form of these spores, is variable ; they are usually pale brownish or yellowish, but they are sometimes green, and the tints of brown and yellow are much varied. These organs differ obviously from seeds, in that they consist merely of a homogeneous cellular mass. In true seeds the radicle (or young root) and the plumule (or young shoot) are present in the embryo, and are developed from determinate points ; but Fern spores, consisting merely of a small vesicle of cellular tissue—a vegetable cell,*

* Hence the name of Cryptogamic,—from crypt, or cell.

grow indifferently from any part of their surface, the parent cell becoming divided into others, which are again multiplied and enlarged, until a small germinal scale, or primordial frond, is formed, and from this, in due time, the proper fronds are produced. The surface of the spores is sometimes smooth, sometimes tuberculate, or even echinate' (prickly like a hedge-hog.)

From this almost invisible dust spring the multitudes of Ferns that crown the summer with their various plumes. Each atom of dust becomes a green speck, then a scale in which root and stem and leaves are yet but one confused and undeveloped mass, then a bud, then a young frond pushing its crozier-like form or its tender spikelet through the earth, then a full-grown magnificent plume like the Royal Fern — 12 feet high by the Irish Lakes, or a dainty coronal of feathers like the common Male Fern so abundant in our own English Mountain District.

The proper roots of Ferns are fibrous, proceeding from the under side of the stem when the stem is prostrate or creeping, but from all sides indifferently when it grows erect. When sufficiently numerous they form entangled masses. The fibres are mostly rigid and wiry, often in youth more or less covered with fine soft hairs.

The stem is sometimes called a caudex, sometimes a rhizome. The *caudex* is the root-stock, not the root, but a true stem, either uprightly-growing or drooping : the upright stem of some foreign ferns sometimes growing to the height of fifty feet or more, like a forest tree. The *rhizome* is the creeping stem, or that part

of the stem extending on or under the ground, very far indeed in some ferns, farthest in the Common Bracken. When not under ground, these creeping stems are generally clothed with hairs or scales, sometimes becoming quite shaggy. The rhizome varies considerably in size, from that of the Common Polypody, which is as thick as one's little finger, to that of the Film Ferns, as fine as thread.

The fronds consist of two parts,—the leafy portion, and the *stipes*, which is the part of the stalk above the caudex or rhizome. The farther continuation of the stalk, forming in the leafy part a midrib, or mid-vein, which becomes branched when the frond is divided (as in the Oak Fern), is called the *rachis* (*rachides* in the plural). The stipes is generally more or less furnished with brownish membranous scales, sometimes only a few at the base, sometimes extending along the rachis. When the frond is divided quite down to the rachis, or midrib, it is said to be *pinnate*, and each of the leaf-like divisions is called a *pinna* (latin for a feather). When these *pinnæ* are again divided in the same manner the frond becomes *bi-pinnate*, or if thrice divided *tri-pinnate*. When the division is nearly but not quite down to the rib or midrib the *pinnule* (or small pinna), the pinna, or the frond, is called *pinnatifid*.

The TRUE FERNS are developed in a peculiar manner, coming up in a crozier-like form, having the rachis rolled in from the point to the base. In the more compound ferns the frond-divisions are each again rolled in after the same fashion. This is called

being *circinate*. All the British species are circinate (and therefore true ferns) except two—the Adder's Tongue and the Moonwort, in both of which the fronds are what is called *plicate*, or folded straight, like the folding of a lady's fan.

The order in which the veins, or ribs, of the fronds are disposed is called the *venation*; and deserves attention as affording one of the means of distinguishing the groups. It is from some determinate part of the veins that the spore-cases proceed. This part is called the *receptacle*. In some few native kinds the receptacle is projected beyond the margin of the frond, and the spore-cases are collected round its free extremity. More commonly, however, the veins stop within the margin, and the spore-cases grow in round or elongated clusters, situated sometimes at their ends, sometimes at their sides, and protruded through the skin of the lower surface of the fronds.

The seeds (it has already been said) are called *spores*, the seed-vessels *spore-cases*, the clusters of spore-cases *sori*. These sori, generally placed on the back or margins of the fronds, are in the great majority of British species surrounded or girt by an elastic ring or band,—sometimes vertical and burst by an irregular transverse fissure when the spores, having reached maturity, need to be dispersed,—sometimes horizontal or oblique, instead of vertical. In the earlier stages of their growth the sori are also covered with a thin transparent membrane, called an *indusium*. As the sori grow, the indusia get broken and thrust back, sometimes flung off. To some

species there is no perceptible iudusium. Its presence or absence therefore affords yet other means of help towards correcter classification.

What classification itself is, how far from being exact to the wonderfully arranged variety of nature, however necessary it is to assist the memory and the understanding of the botanist, may be seen from the interpenetration and confusion of characteristics even in the Table of British Ferns which follows here, and may be gathered also from a few remarks by Dr. Lindley qualifying an attempt to precisely describe only the three great primary order of Exogens, Endogens, and Acrogens. Having spoken of the principal differences between the three classes as to be briefly expressed thus :—

EXOGENS.—wood growing concentrically — leaves with reticulated veins — flowers with their parts arranged in fours or fives—embryo, or germ, dicotyledonous or two-leaved,—

ENDOGENS.—wood confused — leaves with parallel veins — flowers with their parts in threes — germ monocotyledonous or one-leaved,

ACROGENS, — wood sinuous — leaves fork-veined or altogether unbranched — no flowers — and no germ, — he adds :—

‘ In applying these differences to practice, it is necessary to attend to the following rules :—

‘ These classes are not *absolutely* distinguished from

each other by any one character, but by the *combination* of their characters. For this reason a plant may have one of the characters of a class to which it nevertheless does not belong, because its other characters are at variance with that class. Thus some species of Ranunculus have the flowers with their parts in threes; but they do not on that account belong to Endogens, because their wood is concentric, their leaves netted, and their embryo dicotyledonous. Arum maculatum has reticulated leaves; but it is not an Exogen, because its wood is confused, and its embryo monocotyledonous; its flowers are neither in fours or fives nor threes, all the parts being in a state of peculiar diminished structure. The genus Potamogeton (a water plant, one of the Naiads) has the flowers in fours; yet it does not belong to Exogens, because its leaves have parallel veins, and its embryo is monocotyledonous.'

No better words could have been written, whether to stimulate the learner to care and thoroughness in research or to rebuke the dogmatism of pedantic system-builders and teach that modesty and liberal allowance of dissent which should characterize the student of Nature and the worshipper of Truth.

TABLE OF BRITISH FERNS.

Ferns—in Latin *Filices*—are flowerless plants, bearing seed-vessels (spore-cases) on their fronds. ‘All Ferns’ says Moore,—‘are referrible to one of three groups: *Ophioglossaceæ*—*Polypodiaceæ*—*Marattiaceæ*. Of these the *Ophioglossaceæ* and *Marattiaceæ* are but small groups, while the *Polypodiaceæ* include the greater portion of all known Ferns. These three groups may each be regarded as a distinct order of plants, forming together the *Filices*, or Ferns.’ The *Marattiaceæ* are not found in the British Isles. We have therefore only to do with the two natural orders — *POLYPODIACEÆ* or *True Ferns* and *OPHIOGLOSSACEÆ* or *Adder’s Tongue Ferns*.

POLYPODIACEÆ are Ferns whose young fronds are rolled up in a circinate form, and whose spore-cases are girt with an elastic band. The presence of this ring, in some form or other, nearly or completely surround-

ing the spore-case, is the distinguishing peculiarity of the True Ferns. Polypodiaceæ are divided into those whose spore-cases are without valves and those which are two-valved. In the first division are two tribes or groups:—*Polypodineæ*, without valves, bursting by an irregular and transverse cleft, the elastic ring vertical and nearly complete; and *Trichomanineæ*, without valves and bursting irregularly, but surrounded by urn-shaped involucres, the ring horizontal or oblique, complete. The second division has only one tribe or group:—*Osmundineæ*, spore-cases two-valved, opening vertically or at the top, the ring merely rudimentary.

OPHIOGLOSSACEÆ are Ferns whose young fronds are folded up straight and whose spore-cases have no ring. They are two-valved like the Osmundineæ.

POLYPODIACEÆ.

- 1.—*Polypodineæ*;
- 2.—*Trichomanineæ*;
- 3.—*Osmundineæ*.

POLYPODINEÆ—fructification dorsal, that is, the spore-cases borne on the back of the frond. Comprising the sub-groups *Polypodieæ*, *Gymnogrammeæ*, *Aspidieæ*, *Asplenieæ*, *Lomarieæ* or *Blechnææ*, *Pterideææ*, *Adiantææ*, *Dystopterideææ*, *Peranemeææ*.

POLYPODIEÆ—Sori (or clusters of spore cases) round, and with no special indisum (or covering): comprising two genera—*Polypodium Allosorus*.

* GYMNOGRAMMÆ — Sori linear, no indusium : one only genus — *Gymnogramma*.

ASPIDIEÆ — Sori round or roundish, springing from the back of the veins, having a special indusium : two genera — *Polystichum*, *Lastrea*.

ASPLENIEÆ — Sori oblong, or elongated, springing from the sides of the veins, having a special indusium : four genera — *Athyrium*, *Asplenium*, *Scolopendrium*, *Cetarach*.

LOMARIEÆ — Sori forming longitudinal lines between the midrib and margins of the leaflets, or divisions of the fronds, with a special indusium : one genus — *Blechnum*.

PTERIDEÆ — Sori borne upon the frond-margins, which are changed, continuously or interruptedly, into special indusia : one genus — *Pteris*.

* ADIANTEÆ — Sori in patches on the reflexed lobes of the frond-margins, which form indusia : one genus — *Adiantum*.

CYSTOPTERIDEÆ — Sori with special oval indusia affixed behind and bent hook-like over them : one genus — *Cystopteris*.

PERANEMEÆ — Sori roundish and springing from the back of the veins, with special involucriform or semi involucriform indusia : one genus — *Woodsia*.

* Of GYMNOGRAMMÆ — genus *Gymnogramma* — there is only one British species, the small-leaved *Gymnogramma leptophylla*, lately found in Jersey, hardly therefore a British fern at all. Of ADIANTEÆ again its one British genus, *Adiantum* has only one species, the common Maiden-hair Fern — *A. Capillas Veneris*, not found in the Lake District. Neither is the one British species of the genus *Trichomanes*, the Bristle Fern — *T. radicans*.

Trichomanineæ — fructification marginal, that is, having the spore-cases on the edges of the frond ; sori produced around the ends of the veins projecting from the frond-margins, and surrounded by urn-shaped membranous expansions of the frond : two genera — * *Trichomanes*, *Hymenophyllum*.

Osmundineæ — fructification marginal-paniculate, that is, having the spore-cases on the edges of distinct stalks, or in irregular dense branching clusters terminating the fronds : one genus — *Osmunda*.

OPHIOGLOSSACEÆ.

Fructification paniculate, in irregularly branching clusters, spicate, or sessile (sitting close to the stem without any sensible stalk) in two ranks on a simple spike, terminating a separate branch of the frond ; two genera *Botrychium*, *Ophioglossum*.

* See note at page 14.

CIRCINATE



LIST OF LAKE DISTRICT FERNS.

(16 Genera — 36 Species.)

POLYPODIUM : — (1) *P. vulgare*, (2) *P. Phegopteris*,
(3) *P. Dryopteris*, (4) *calcareum*.

ALLOSORUS : — *A. crispus*.

POLYSTICHUM : — (1) *P. Lonchitis*, (2) *P. aculeatum*,
(3) *P. angulare*.

LASTREA : — (1) *L. Thelypteris*, (2) *L. montana*, (3)
L. Filix-mas, (4) *L. remota*, (5) *L. rigida*,
(6) *L. cristata* — var. *spinulosa*, (7) *L. dilatata*, (8) *L. æmula*.

ATHYRIUM : — (1) *A. Filix-foemina*.

ASPLENIUM : — (1) *A. Adiantum-nigrum*, (2) *A. marinum*, (3) *A. Trichomanes*, (4) *A. viride*,
(5) *A. Ruta-muraria*, (6) *A. germanicum*,
(7) *A. septentrionale* (8) *A. Lanceolatum*.

SCOLOPENDRIUM : — *S. vulgare*.

CETERACH : — *C. officinarum*.

BLECHNUM : — *B. spicant*.

PTERIS : — *P. aquilina*.

CYSTOPTERIS : — *C. fragilis*.

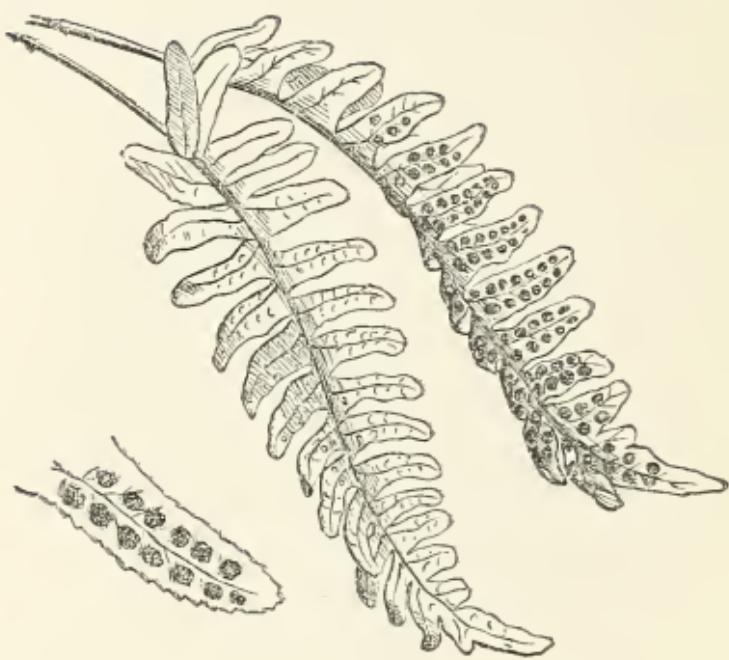
WOODSIA : — *W. ilvensis*.

HYMENOPHYLLUM : — (1) *H. Tunbridgense*, (2) *H. unilaterale*.

OSMUNDA : — *O. regalis*.

BOTRYCHIUM : — *B. lunaria*.

OPHIOGLOSSUM : — *O. vulgatum*.



THE COMMON POLYPODY.

THE POLYPODIES.

THE COMMON POLYPODY.

Polypodium vulgare.—LINNÆUS.

The name of *polypodium*, meaning *many-footed*, is given to this genus, on account of the many branchings of its rhizome or creeping stem. The Common Polypody is an evergreen (the fronds, even in severe frosts, lasting till new ones are produced), growing luxuriantly on tree trunks, moist rocks and walls, and mossy banks, easily distinguished by its large round patches of orange or tawny-brown spore-cases, no other of our native ferns having its fructification at all similar in appearance.

The rhizome of the Common Polypody is often as thick as a man's little finger, covered with light brown chaff-like scales, tapering to a point, sometimes drooping so as to leave the upper surface smooth and greenish. From this upper surface spring the fronds, and from the lower side chiefly the densely-matted fibrous roots by which it clings for support. The

stipes (or stalk) is naked, sometimes nearly as long as the leafy portion, the whole frond measuring from two to eighteen inches or more. The general outline is lance-shaped, very deeply pinnatifid, the lobes or segments oblong, generally round but sometimes bluntly pointed at the end, and occasionally notched along the margin. Each lobe has a slightly wavy mid-vein, or rib, branching alternately, each branch having four or five alternate branchlets, the lowest of which on the side next the point of the frond (rarely any other) produce a sorus at its club-shaped head. The fructification is usually confined to the upper part, and is generally ripe by the end of September.

The Common Polypody differs essentially from all the other British species associated with it, in having its fronds articulated with the rhizome,—that is attached in such a manner that they fall off at the approach of decay. Its texture, too, is stouter and firmer than that of other native species. The rhizome is perennial. It is one of the commonest ferns, found everywhere, on the coast line and (in the Scottish Highland) at the height of 2,100 feet, very abundant and handsome in the Lake District, abundant also throughout Europe, and the north of Africa, found also in Caffraria, in northern Asia from the Ural Mountains to Japan, and widely dispersed in North America. Its medical reputation is as old as Pliny, who says that the root, dried and powdered and snuffed up the nose, will destroy polypus. It is supposed to be the ‘rheum-purging Polypody’ of Shakspeare, and in some

country places they still use a decoction of the fronds as a remedy for colds and hooping-cough, employing for the purpose the ripe fertile fronds, which, called Golden Locks and Golden Maidenhair, are gathered in the autumn and hung up to dry like other herbs. The fronds contain a large quantity of carbonate of potass. It is easily cultivated, requiring only a light porous soil and that the rhizome should be kept on the surface, with a constant supply of moisture, good drainage, and moderate shade.



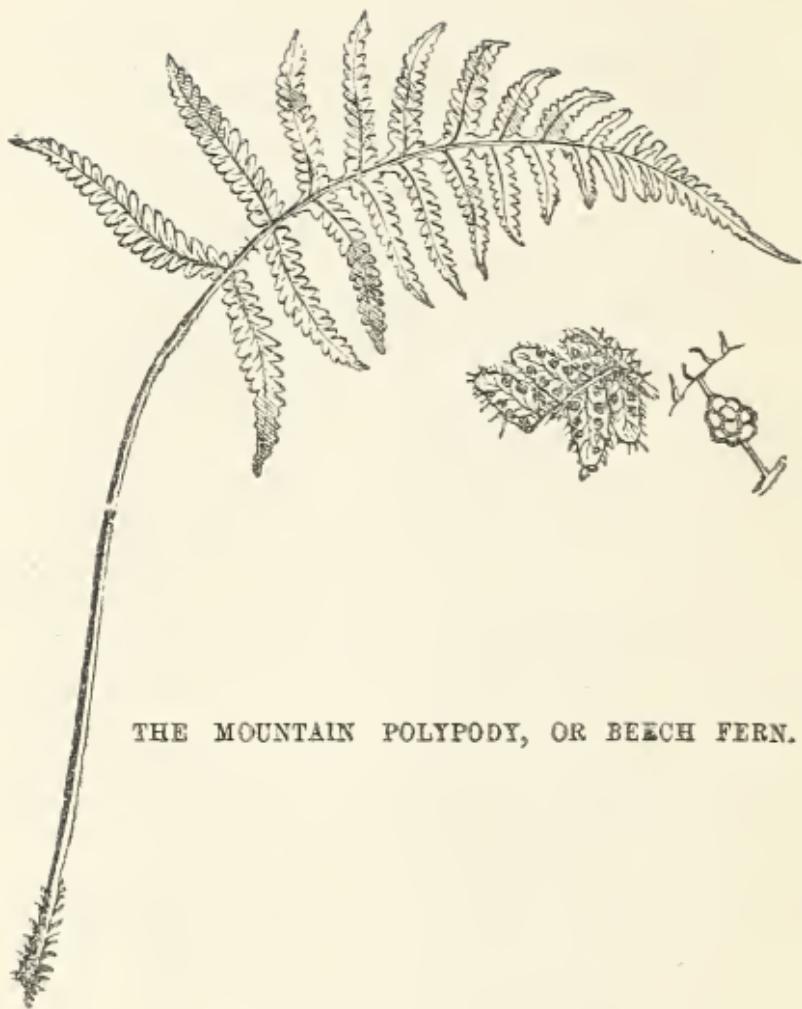
VAR. BIFIDUM.

VARIETIES OF

NAMES	BY WHOM NAMED	BY WHOM FOUND	WHEN FOUND
1 acuto bifidum	Wollaston	J. M. Barnes	1858
2 attenuatum	Wollaston	R. Preston	1866
3 auritum	Moore	several	
4 bifido-multifidum	Mapplebeck	T. Walmsley	1869
5 bifidum	Francis	several	
6 Cambricum Barrowi	Barnes	T. Barrow	1874
7 " Hadwinii	"	Hadwin	1875
8 " Prestonii	Moore	R. Preston	1871
9 crenatum	Wollaston	several	
10 curtum	Monkman	J. K. Hodgson	1870
11 Dentatum	Moore	several	
12 " Barnesii	Moore	J. M. Barnes	1865
13 " Whittakeri	"	Whittaker	1844
14 foliosum	Wollaston	J. M. Barnes	1862
15 folioso-abruptum	Barnes		1863
16 garndiceps	Barnes	Mrs. Fox	1868
17 irregulare	Moore	J. M. Barnes	1864
18 minimum	Mrs. J. K. Hodgson	Mrs. J. K. Hodgson	1866
19 multifidum	Moore	F. Clowes	1
20 multifidum	"	J. A. Martindale	1865
21 marginatum	"	F. Clowes	1857
22 " Crosfieldii	"	J. Crosfield	1862
23 multiforme	"	several	2
24 obtuso-serratum	"	J. M. Barnes	1863
25 omnelacerum Aldrenii	Barnes	Aldren	1873
26 pulcherrimum	Stansfield	T. Addison	1861
27 ramosum	G. Whitwell	G. Whitwell	1879
28 semilacerum	Link	several	1
29 semilacero-robustum	Moore	J. M. Barnes	1863
30 " -truncatum	Barnes		1863
31 sinnato-auritum	Moore	"	1865
32 serratum	"	several	1
33 serra	Wollaston	J. A. Wilson	1868
34 suprasoriferum	"	J. M. Barnes	1865
35 " Huckii	Barnes	T. Huck	1870
36 variegatum	"	J. M. Barnes	1866

OLOPODIUM VULGARE.

WHERE FOUND	PROMINENT CHARACTER	REMARKS
Upton	points of pinnæ bifid and acute	this form is very fine
Hall	pinnæ long and attenuated	small growing form
Any places	lower pinnæ with an auricle	a fine variety
Grange	bifid and crested	rather common
Any places	points of lower pinnæ bifid	a grand variety
Therslack	thin in texture and finely cut	rather common
Verdale	plumose	fine form
Hall	tripinnatifid and very dense	very beautiful
Any places	margin of pinnæ crenated	a splendid form
Lake Valley	fronds normal in length, 1 in. wide,	a fine form but not constant
New places	edges of pinnæ toothed	a remarkable sport
Rock Head	evenly and deeply dentate	not frequently met with
Mar Kendal	evenly dentate	a beautiful form
Verdale	frond very broad leafy	a not uncommon form
Therslack	" " "	rarely met with
Mar Grange	heavily crested	this grand plant now in the hands of Mrs. J. K. Hodgson
Wormell Fell	fronds and pinnæ irregular	a splendid form
Nom	very small fronds any shape	curious but not pretty
Whitbarrow	crested	a strange little pygmy
Mar Staveley	pinnæ as if eaten by insects	
Indermere	" not two fronds alike "	curious but not pretty
Inside	cornute and serrate	found only on the limestone
Several places	pinnæ with long acute lobes	a rare form
Whitbarrow	robust and tripinnatifid	a fine form
Mar Milnthorpe	fronds ramosed	a neat form
Whitbarrow	bipinnatifid	a magnificent form
Mar Kendal	very robust and leathery	a fine limestone form
Any places	frond and pinnæ ending	a grand form
Whitbarrow	with a horn	a fine form
Wens Park	pinnæ irregular, &c.	
" "	pinnæ cut like a saw	not handsome
Werness Fell	basal pinnæ erect	
Wormell Fell	sori on the upper surface	
Mar Kendal	" variegated " white and green	a sort of subcambricum
Therslack	" "	a very strange sport



THE MOUNTAIN POLYPODY, OR BEECH FERN.

THE MOUNTAIN POLYPODY,
OR BEECH FERN.

Polypodium Phegopteris.—LINNÆUS.

The Beech Fern is one of the tenderer Ferns: produced from the perennial rhizome about May, and dying off in the autumn or at the first approach of frost. It grows abundantly on the slate in moist mountainous places and in the shade of damp woods, from the coast level to (in the Western Highlands of Scotland) an elevation of over 3000 feet. The stem is slender, creeps very extensively, and is slightly scaly, producing black fibrous roots. From it spring delicate hairy pale-green fronds, to the height, when full-grown, of from six to twelve inches. The stipes is fleshy and very brittle, frequently longer, sometimes much longer, than the leafy part of the frond, having near its base a few small and almost colourless scales. The fronds are triangular, extending to a long narrow point; in the lower part pinnate,—but with this division seldom carried beyond the two lowest pairs of branches, those of the upper parts of the fronds being pinnatifid (connected at the base).

The pinnæ (or leaflets) have an acutely lance-shaped outline and are deeply pinnatifid, usually standing in pairs, opposite to each other, the lowest pair drooping toward the root and set on at a short distance from the rest. The united bases of the pairs of the other pinnæ — when they happen to stand exactly opposite to each other — exhibit more or less distinctly a cruciform figure, by which, regard being had also to the general triangular outline and sub-pinnate division, this species may be known from the other Polypodies. The venation consists of a slender flexuous midvein (or rib), from which proceed alternate or sometimes opposite veins extending to the margins of the lobes or lobules,— either simple or once forked at about half their length. The veins when simple, or the anterior venules when divided, bear a sorus at a short distance from the edge of the lobule. This almost marginal fructification extends nearly over the whole frond, the sori being small and circular, arranged in series, and often becoming confluent in lines. When the fructification is but partially developed only one or two of the lowermost veins are fertile, in which case the marginal series of sori is not very manifest. The spore-cases are small, numerous, and of a pale brown hue; the spores ovate and smooth. The fronds in this species become lateral and distant from each other on the underground stem, in consequence of its rapid elongation; and they are adherent, that is to say, the stipes is not furnished with a natural point of spontaneous separation.

For cultivation in pots or cases it requires good

current moisture, and grows well on the damp and shady sides of garden rock-work.

HABITATS.

Scafell, Wastdale, Borrowdale, Ennerdale, Keswick, Lindal Fell, Newbiggin Woods, Stockgill Force, Ambleside, Grasmere, Casterton Fell, Wallington, Coniston, and, excepting the limestone, generally distributing through the district.

VARIETIES.

interruptum,—Witherslack, J. M. Barnes, also by G. Whitwell,
Langdale, 1889.

irregulare,—Patterdale, Wm. Forster, 1882.

multifidum,—Burton, J. Jones.

strictum,—Witherslack, J. M. Barnes.



THE OAK FERN.

SMOOTH THREE-BRANCHED POLYPODY
OR OAK FERN.

*Polypodium Dryopteris.**—LINNÆUS.

This, the smallest of the Polypodies, is also one of the most delicate of all British Ferns: very easily recognizable by its smooth fronds, of a bright lively green, divided into three branches,—the last characteristic even more obvious in the young fronds, which are rolled up in little balls at the ends of their three slender stalklets. Its height is generally not more than six inches, often less, but it sometimes grows to twelve or fourteen. It is fragile, produced about April, and in succession throughout the summer, soon withered by heat or drought, and at once destroyed by frost. The fronds rise from a slender creeping stem, which often forms densely matted roots. The stipes is usually much longer than the leafy part, thin, brittle, and dark coloured. The general outline is five-sided, owing to the division of the fronds into three triangular branches. One of the peculiarities of the Oak Fern is the deflection of the rachis (or

* Also *Polystichum Dryopteris*, *Lastrea Dryopteris*, &c.

midrib) at the point where the branches take their rise ; and another (of less botanic importance, but very helpful in distinguishing it from its near ally, the Limestone Polypody) is its perfect smoothness, a constant distinction, most easily seen on the stipes and rachis, but equally occurring over the whole plant. The fronds are divided so that each branch is pinnate at the base, pinnatifid toward the point ; the pinnae are also pinnate at their bases, then pinnatifid, and at their points acute and nearly entire ; the pinnules and ultimate lobes are oblong and obtuse, with a rather wavy midvein, from which the venules branch alternately, extending to the margin,—in those of moderate size simple with a sorus at each extremity, in the larger branched with the sorus on the lower branch. The fructification varies much, according to habitat and season, being sometimes very much crowded and sometimes very sparse. The spore-cases are small, roundish obovate (inversely egg-shaped), and attached by a slender stalk ;— the spores ovate (egg-shaped), oblong, or roundish, with a granular surface.

Like the Beech Fern, the *Dryopteris* is found from the coast-level to a great elevation. It is very rarely *if ever* seen on the limestone, and must be classed as a slate fern, liking a rocky district, with running water, and the not stagnant moisture of woods, needing both shade and shelter. It is easily cultivateable in a mixture of fibry peat, or leaf-mould, mixed with blue stone, earth, or sand, either in the house or on artificial rock-work.

HABITATS.

Lodore, Borrowdale, Honister Crags, Scale Force, Gillsland, Wastdale, Dalegarth, Stockgill, Glenridding, Hutton Roof, Casterton, Coniston, Furness Fells, and, like the *Beech* fern, generally distributed through the district.





THE LIMESTONE POLYPODY.

THE LIMESTONE POLYPODY.

Polypodium calcareum. SMITH.*

The Limestone Polypody differs from the Oak Fern in its stouter, erecter, and more rigid habit, and in the mealy-looking glandulosity of its surface; yet still more in that the division of its fronds is pinnate rather than into three distinct branches. The fronds are also of a duller and deeper green, and without the marked deflection of the rachis. And instead of the branches being rolled up into three balls, the young pinnae curl in on their rachides and the entire frond upon its rachis, so that the frond is of the ordinary bipinnate structure. Its fronds, including the stipes, vary from six to eighteen inches in height: their form is triangular with a tendency to the pentagonal appearance of the Oak Fern, because of the larger size of the two lower pinnae. These lower pinnae are pinnate, with pinnatifid pinnules again pinnate and the upper pinnatifid. The fructification is scattered over the whole dorsal surface of the frond;

*Also *P. Robertianum*, *P. Dryopteris*, *Lastrea calcarea*, *Lastrea Robertianum*, *Phegopteris calcarea*, &c.

the sori are small and round, consisting of numerous crowded spore-cases, entirely without indusia, arranged in linear sub-marginal series along each side of the lobules, or in series between the midrib and margin when the lobules are but slightly developed,— often more or less confluent. Spore-cases pale brown, roundish obovate, small and numerous. Spores ovate or oblong, somewhat granular.

The Limestone Polypody, as its name infers, is found usually on exposed rocky limestone tracts: growing there very abundantly. In cultivation, however, a limestone soil is not essential to its well-being. Like the generality of Ferns, it requires good drainage, but bears the sun more than others. It grows almost throughout Europe, in Canada, and the United States of America; and has been gathered by Dr. Hooker and Dr. Thomson on the Himalaya Mountains at the elevation of 6,000 feet.

HABITATS.

Scale Force (*J. Robson*), Whitbarrow, Newbiggin Woods, Gilt Quarries, Baron Heath, Arnside Knott, Hutton Roof Crags, Farleton Knott, Caskill Kirk, &c.

Only one variety:

variabile,— Whitbarrow, J. M. Barnes and F. Clowes.



THE MOUNTAIN PARSLEY FERN.

THE ROCK BRAKES.

THE MOUNTAIN PARSLEY FERN.

Allosorus crispus.—BERNHARDI.

Osmunda or Pteris crispa.—LINNÆUS.

Of the Rock Brakes there is but one British species — the Mountain Parsley Fern, known at once by its likeness to tufts of parsley, and distinctly differing from other of our native Ferns in the marked division of its sterile and fertile fronds,—the first of which have these segments broad, flat, and leaf-like, while the second have them involute, or rolled in at the margin, covering the sori instead of an indusium. The fronds of the Mountain Parsley Fern are annual, coming up in May or June, and dying down in the autumn, from four to twelve inches high (including the stipes), of a lively green, triangular or ovately triangular in outline. The barren fronds are generally as long as the stipes, bi or tri-pinnate, and smooth.

The segments or leaflets into which they are cut are more or less wedge-shaped and notched or cleft at their ends. The fertile fronds have the leaflets of an oval or oblong or linear form. The venation of the barren fronds consists of a slender vein extending along each pinnule, casting off another into each of its lobes, this again alternately branching, one branch being directed towards every marginal point. In the fertile fronds a midvein enters each ultimate division and passes sinuously to its point, throwing out nearly to the margin alternate veins, usually simple but sometimes forked, bearing a sorus near their ends. The fructification usually occupies the whole system. The sori small, roundish, at first distinct though contiguous, ultimately becoming laterally confluent and forming a continuous line. Spore-cases small, elliptic obovate, stalked. Spores smooth, roundish, oblong or bluntly triangular.

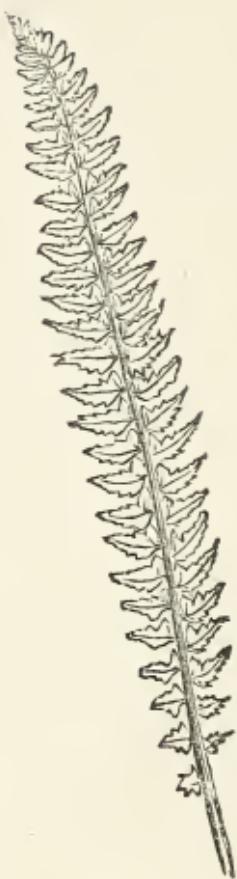
The Mountain Parsley Fern is peculiarly a mountain plant, delighting in the shades and corners of boulders, and to be among loose slate stones, and at the feet of the unmortared walls that wind about the fells and mountains. It is well-fitted therefore for garden rockeries ; but it is apt to die off in winter if allowed to be too damp.

HABITATS.

Skiddaw, Keswick, Whinlatter, (*W. Christy*), Borrowdale, Ennerdale, Scafell, Helvellyn, Blencathra, Kirkstone Pass, Ambleside, Coniston, Gras-

mere, and, excepting the limestone, which it abhors, is plentiful throughout the whole of the mountainous part of the district.

The only variety is a beautifully crested form, found by Mr. Nixon, head gardener to the Right Hon. R. A. Cross, of Broughton-in-Furness, at Seathwaite, in 1874.



THE HOLLY FERN.

THE SHIELD (AND BUCKLER) FERNS.

THE ALPINE SHIELD FERN, OR HOLLY FERN.

Polystichum Lonchitis.*—ROTH.

POLYSTICHUM is an extensive genus of the group of Aspidieæ; and consists for the most part of harsh spiny evergreen ferns, scattered from the torrid to the frigid zone,—but represented in this country by only three species: — *Polystichum Lonchitis*, *Polystichum aculeatum*, and *Polystichum angulare*. These species, however, are very variable, and so closely connected by intermediate forms that it is difficult sometimes to distinguish their exact limits.

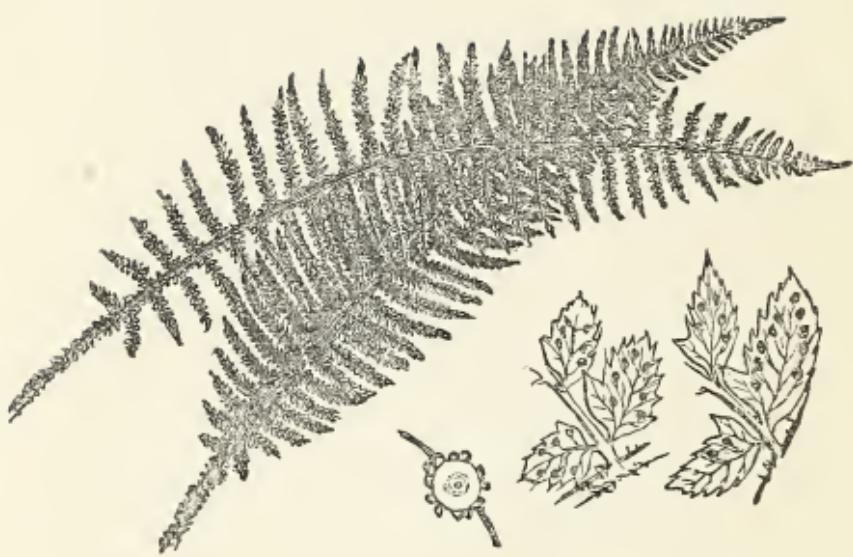
The Alpine Shield Fern is one of the rarer ferns, taking its other name of Holly Fern from its hard and prickly appearance. It is an evergreen, with a scaly tufted stem from the crown of which the young fronds are produced in spring, to remain fresh and vigorous until the spring following, arriving at matu-

* *The Polypodium Lonchitis* of Linnæus.

rity in autumn and flourishing through the winter. It is a true rock fern, growing to a height of from six to nine inches, but higher and more luxuriantly in damp and slightly elevated situations. The fronds are of a deep green, pale beneath, of a rigid leathery texture, erect or drooping according to the conditions of their growth; once pinnate, and in their general outline narrowly lance-shaped, or lanceolate. The pinnae are short, crowded, and shaped something between a sickle and crescent, the upper side of the base having an ear-like projection, called an auricle, while the lower side is as if cut away. The margin is set with spinous teeth. The venation is very indistinct, the veins twice-branched, the branches extending to the margins without joining with others. The sori form a line on each side the mid-rib, parallel with it and half way between it and the margin, generally becoming confluent in age, and covered by a circular membranous scale attached by a short central stalk. Spore-cases deep brown. The name *Polystichum* is from two Greek words signifying *many* and *order*, given on account of the number and regularity of the lines of sori. It is difficult of cultivation, needing pure mountain air, and therefore seldom thrives under artificial treatment.

HABITATS.

Helvellyn (*Isaac Huddart* and *F. Clowes*), Fairfield (*James Huddart*), Deepdale (*M. Hankey*), Ullswater (*Rev. W. H. Hawker*), Farleton Knott (*J. Jones*).



THE COMMON PRICKLY SHIELD FERN.

THE COMMON PRICKLY SHIELD FERN.

*Polystichum aculeatum.**—ROTH.

The common Prickly Shield Fern is one of the larger and hardier Ferns, preferring, however, a loamy soil and the partial shade of woods or hedge-banks, where it grows to the height of from a foot to two feet or more, with a short stipes densely enveloped in rust-coloured membranous pointed scales. The fronds, from four to seven inches across, are like the Alpine Shield Fern, rigid and leathery in texture, of a shining dark green above, paler beneath, erect and spreading, or occasionally drooping, growing up in a circle in April or May, from a stout tufted stem or crown. The general typical form is broadly lanceolate; (in its young state commonly but erroneously called the variety *LOBATUM*, it is very narrowly lanceolate); bi-pinnate, with alternate pinnæ, these pinnæ being again more or less divided into a series of pinnules, either decurrent—that is insensibly merging in the substance of the rachis which supports them, or tapering to a wedge-shaped base and attached to the rachis by the point. The pinnules are of a long crescent

* *Polypodium aculeatum*,—Linnæus. Also *Aspidium aculeatum*.

shape, with the upper base extended into a small auricle, or enlarged lobe, and the lower base sloped away,—the apex going off to an acute point, and the margin notched with spiny teeth. Venation, fructification, and indusium, similar to *P. Lonchitis*.

Young plants of this species, when the fronds are from two to four or five inches in length, have very much the aspect of *P. lonchitis*, and have been called by some botanists var. *lonchitidioides*; in this state the pinnules are confluent except in the lowest pair of pinnæ, where the basal pinnule is always free, or not confluent, as in the rest of the frond. If this be observed, it cannot be mistaken for *P. lonchitis*. When the fronds have attained the length of from five to ten inches or more they still retain their narrow outline, but the pinnules become less confluent; several of them, on the lower part of the fronds, next the rachis, having become free. In this state it is the so-called species **LOBATUM** of some botanists; and the var. *lobatum* of others. As all mature plants of the species pass through these stages, it seems strange that such errors should have existed so long.

The Common Prickly Shield Fern is one of the most easily cultivated of all our larger and hardier species. With good drainage and moderate shade, it thrives admirably in almost any soil or situation.

HABITATS.

Irton Woods (*Robson*), Ara Force (*H. Fordham*), Ambleside and Rydal, and may be found in woods, ghylls, and hedge-rows throughout the district.

VARIETIES.

multifidum, — Levens, J. Wood; Whiteside Fell, J. M Barnes;
Silverdale, J. Crosfield.

crestato-gracile, — T. Bolton, Hutton Roof Crag, 1865.

gracile, — T. Hartley, near Bowness, 1874.

THE SOFT PRICKLY SHIELD FERN.*

Polystichum angulare.—PRESL.

This species is not easily distinguished from *P. aculeatum*, though certainly distinct. The two may, however, be generally known from each other by the following differences:—*P. angulare* is less stout, less erect, and altogether less rigid in texture, normally lax and more herbaceous, while equally large or larger. 2—*P. aculeatum* has its pinnules either confluent or decurrent (in which case there is no difficulty in distinguishing it), or when the pinnules are distinct, as in the most perfect plants, they are wedge-shaped at the base, the anterior side being truncate, and the posterior obliquely incised in straight lines, the two lines describing an acute angle, by the apex of which they are attached to the rachis; while in *P. angulare* the truncated anterior base is more curved in outline and the two lines of the base describe a right angle or an obtuse angle, at the apex of which is a distinct slender stalk, by which they are attached. 3—*P. aculeatum* has its sori attached at a point along the middle part of the venule, the apex of which

* Or Angular-lobed. *Polystichum aculeatum*, *Aspidium angulare*, *A. aculeatum*, *Polystichum angulare*, &c.

is carried out to the margin of the pinnule, the sori thus being placed nearer to the point of forking or branching than to the apex of the venule; while in *P. angulare* the fertile venule stops about, midway across the pinnule, and the sorus is generally placed at or almost close to the apex. The basal pinnules and the portion rather below the middle of the frond should be taken for examination. The upper parts of the fronds alone, in these Polystichums, are useless for the purpose of identification.

The Soft Prickly Shield Fern is one of our most graceful ferns, strong-growing and tufted-stemmed, sometimes forming great masses, the fronds lanceolate and rising to the height of from two to five feet, lasting through ordinary winters and in sheltered places retaining their verdure until the new fronds are produced, the old fronds only gradually dying off as the new ones become developed, in or about May. The stipes, varying from a third to a fourth of the length of the whole frond, is very shaggy, with reddish chaff-like scales continuing though decreasing in size throughout the upper portions of the frond. The fronds are bipinnate, with numerous tapering distinct pinnæ, having their pinnules flat, and somewhat crescent-shaped, from the prominent auricle at the anterior base, often bluntnish at the apex but sometimes acute, always with spinulose marginal serrature, and sometimes in a few of the lower pinnules, with deep lobes so that the pinnules become pinnatifid, The pinnules taper to an obtuse or right-angled base, and are attached, as before said, by a slender stalk

which does not form a line with either margin. The pinnules have branched free veins; and the sori are generally ranged in a row on each side of the midrib and covered by a peltate (fixed to the stalk by the centre) scale or indusium.

Not only one of the most beautiful, this is also one of the most remarkably varied of our Ferns. Evergreen, and able to readily accommodate itself to the changes of artificial culture, it is specially fitted for the out-door or in-door fernery; growing readily in pots (with sufficient room) in the garden or shrubbery, in free sandy loam, or on shady rockwork. It is easily increased by division whenever lateral crowns are produced. It is rare in the north of England, or of Europe, though found in Sweden and Norway, but is more plentiful in the north of England, and very abundant in central and southern Europe; in Asia also, from Georgia to India and Ceylon; in Abyssinia and on the African coast of the Mediterranean; and in North and South America, in New England and in Mexico and Chili. It is found not infrequently in the Lake District, generally in warm sheltered ghylls.



VAR. PROLIFERUM.

VARIETIES OF POLYSTICHUM ANGULARE.

NAME.	BY WHOM NAMED	BY WHOM FOUND	DATE	WHERE FOUND	PROMINENT CHARACTER	REMARKS
<i>acutilobum</i> Hartleyæ	Wollaston	Mrs. Hartley	1863	Furness Fell	frond erect, acute in all its parts	very distinct
<i>alatum</i> Hartleyi	Barnes	T. Hartley	1870	"	pinnules confluent and unbribated	a distinct and good variety
<i>apulaforme</i>	Moore	Mrs. Wilson	1863	Cunsey	fronds fish-shaped,	resembling Stansfieldii
<i>biserratum</i> Barnesii	Wollaston	J. M. Barnes	1861	Whitbarrow	pinnules strongly serrate	a moderate form
<i>cristato gracile</i> Barnesii	"	J. Crossfield	1890	Witherslack	pinnæ & pinnules crested	distinct & beautiful form
<i>"</i> <i>Crossfieldii</i>	Moore	J. A. Wilson	1859	Arnside	narrow and bulb-bearing	[mose]
<i>curto-preflerum</i> Clowesii	Wollaston	F. Clowes	1863	Cunsey	pinnules deeply cut	robust, dense, and plu-
<i>decompositum</i> Clowesii	Moore	Mrs. Hodgson	1860	Whitbarrow	"	" with
<i>"</i> <i>Hodgsoniae</i>	Barnes	Mrs. Hodgson	1863	near Ulverston	"	a nice form, seldom met
<i>levidense</i>	Wollaston	J. M. Barnes	1866	Windermere	pinnules thin, and long-	Mr. Wollaston says, the
<i>multifidum</i>	"	several		several places	stalked	best of this form
<i>pediculatum</i>	A. Jones	Mrs. Hodgson	1869	near Ulverston	apex of fronds branched	some fronds with very
<i>proliferum</i> Masonii	Barnes	A. Mason	1863	Humphrey Head	pinnules long-stalked	[larco heads]
<i>rotundatum</i> Hodgsoniae	"	Mrs. Hodgson	1870	Leece, Ulverston	fronds bearing bulbs	a finely-cut form
<i>serrulatum</i>	A. Jones	"	1870	near Dendron	pinnules lax, thin and round	a distinct and beautiful form
<i>setosipinnulum</i>	Wollaston	J. K. Hodgson	1866	Gleeston Lane	pinnules strongly serrate	
<i>stipitatum</i>	"	"	1866	several places	late	
<i>tripinnatum</i>	Moore	several			pinnules bristly	[form]
<i>serratum</i>	Barnes	T. Airey	1872	Cartmel	pinnules crowded	a dense and distinct
<i>inequale</i>	Moore	"	1872	Dale " Park	pinnules cut to the midvein	a grand plant when well grown
<i>Aireyi</i>	Barnes	"	1873	"	pinnules unequal	rather pretty
<i>placatum</i>	Wollaston	"	1873	"	" deltoïd, &c.	an irregular form
					"	a fine form
					"	a narrow form

THE FEMALE BUCKLER, OR MARSH FERN.

*Lastrea Thelypteris.** — PRESL.

The *Lastreas* (not *Lastræs* as often written) take their name from M. de Lastre. They are to be known from *Polystichum* (both belonging to the *Aspidieæ*) by the outline of the indusium, which is kidney-shaped or roundish with a notch in the side, the attachment to the frond being at the notched part. There are no less than eight species of this genus found in Great Britain (and in the Lake District), and the group includes some of the largest, the commonest, and the most elegant of our Ferns.

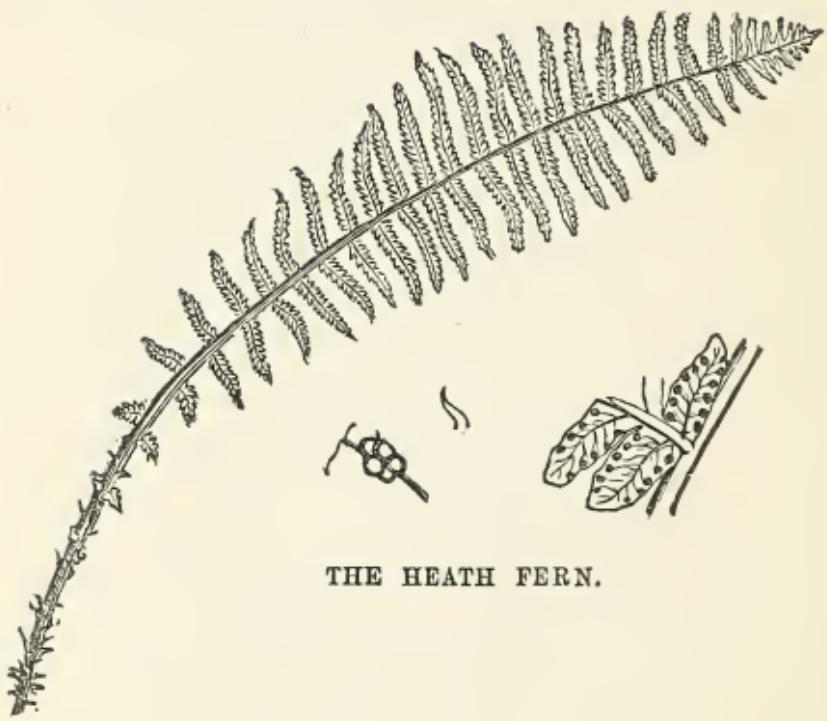
The rhizome creeps extensively, sparingly branched, producing fronds at intervals, slender, smooth and blackish brown, having a few pale brown scales at the growing point, and numerous fibres. The stipes is as long as or longer than the leafy portion in the fertile frond, rather shorter and slighter in the barren, the whole frond growing to the height of from six inches to more than three feet, the fertile fronds the taller. The fronds, produced about May and perishing in Autumn, are delicate in texture, pale green, lanceolate, and pinnate; the pinnæ mostly opposite, a short distance apart, and pinnatifidly divided into numerous crowded entire rounded lobes, the lobes of the fertile

*The *Polypodium Thelypteris* of Linnaeus, also *Aspidium Thelypteris*, *Polystichum Thelypteris*, *Athyrium Thelypteris*, &c.

frond appearing narrower and more pointed on account of the bending under of their margins. The venation of the lobes consists of a distinct somewhat wavy mid-vein, from which alternate venules branch or fork out, each branch bearing a sorus half way between the midvein and the margin. The sori often become confluent and are partly concealed by the bending back of the margin. The indusium is small, thin, shapeless and soon thrown off.

The Marsh Fern is to be known from the other Buckler Ferns by its long, comparatively slender rhizome, which is unlike that of any other native species. It ought not therefore to be confounded, as it sometimes is, with *L. Oreopteris*, which has a short thick tufted caudex, merely decumbent in habit. It differs farther in having its fronds of their full width almost to the very base, and supported by a long bare stipes, while *L. Oreopteris* has diminished pinnæ carried down almost to the base of the stipes; and in its fronds being almost free from glands, while those of *L. Oreopteris* are very conspicuously glandular and very fragrant. It is still less like other species. It is readily cultivable, wanting only a moist peaty situation, a damp garden border or a boggy pool, where its rambling stems may have room to spread. If set in pots they should be large and shallow.

Only two stations for this rare fern are known in the district: it was discovered, about the year 1853, by Miss E. Hodgson, Miss A. Hodgson, and Miss A. Parker, at Rowdsey, near Ulverston also, in 1888; near Kendal by T. B. Wright.



THE HEATH FERN.

THE MOUNTAIN BUCKLER,
SWEET MOUNTAIN, OR HEATH FERN.

*Lastrea Oreopterisi** — PRESL.

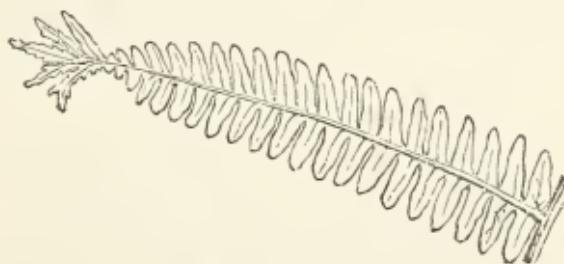
The Sweet Mountain Fern is known at once by its balsamic scent, the fragrance of which is given out strongly from numerous minute resinous glands on the lower surface when the frond is drawn through the hand. The fronds are noticeable also for their coronal appearance, set on the stem like the feathers of a shuttle cock and growing in graceful tufts to two or three feet high. They are annual, springing up in May and dying off in Autumn; bright green or yellowish, erect, lance-shaped in general outline, and pinnate. The stipes is usually short, the leafy part being continued nearly to the ground, and the lower pinnæ becoming so short that the frond tapers downward as much as toward the point. The pinnæ are generally opposite, narrow, tapering and pinnatifid, and bear the sori almost close to the margins, in most instances very abundantly. The fronds differ, as was said, from *L. Thelypteris* in the shortness of the lower pinnæ, and again in the margins being flat and not

* *Lastrea montana* (Moore), *Polystichum Oreopteris* (deCandolle), *Aspidium Oreopteris*, *A. odoriferum*, *Polypodium montana*, *P. fragrans*, *P. Thelypteris*, *Phegopteris*, *Oreopteris*, &c.

turned back upon the sori. Each lobe has a distinct and slightly wavy midvein, alternately branched, the branches simple or divided, with the sori near their extremities. The indusia are small and soon perish or fall away, sometimes seem to be altogether wanting; but the plant is too closely allied to other species of the genus to allow of its separation on this account. It grows in damp woody places, especially luxuriating by the sides of shady becks and waterfalls; but is much more profusely met with on heathy mountain sides. It is the common fern of many parts of the Scottish Highlands, growing sometimes at an elevation of 3,000 feet; abounds in the English Lake Country, and in Wales; and is more or less plentiful in waste districts throughout England. It is also found in many other parts of Europe, and has been reported from North America, but Moore says this requires confirmation. Though so common, it has been considered difficult of cultivation, requiring the pure air and ready drainage of its native mountains. It is true, like most other ferns, it will not thrive in a smoke-poisoned atmosphere, but recent experience has proved that where the air is moderately pure few ferns are more easy of cultivation, or require less attention. It does not, as has been supposed, require an abundance of water; it is true it will live under conditions of moisture that would be considered an excess for other ferns, but this seems to be entirely owing to the hardiness of its constitution: it will thrive admirably in a proper compost, if treated, in respect to water, the same as other dry land ferns.

Like the *Blechnum*, this fern utterly abhors lime in every form; calcareous earth or hard water are its certain destruction, and possibly the want of this knowledge may have been the reason why it has been considered so difficult of management. In a compost made up of peat from the top of a bog where ling or heather has grown (not going deeper than three or four inches) and blue stone or slate earth, mixed in the proportion of two thirds peat to one-third earth, and watered when required with soft or rain-water, this plant will thrive almost anywhere, and if put into large pots will grow even more luxuriantly than in its native glens and valleys.

It was thought, a few years ago, that this species was not given to producing varieties, like some of its neighbours, and doubtless for this reason it has suffered considerably from neglect; but recently many beautiful and interesting forms have been found, some of them truly magnificent, not even surpassed by those of the *Lastrea Filix-mas* or the *Athyrium Filix-fœmina*. There can be little doubt that this species is quite as prolific in varieties as any other.

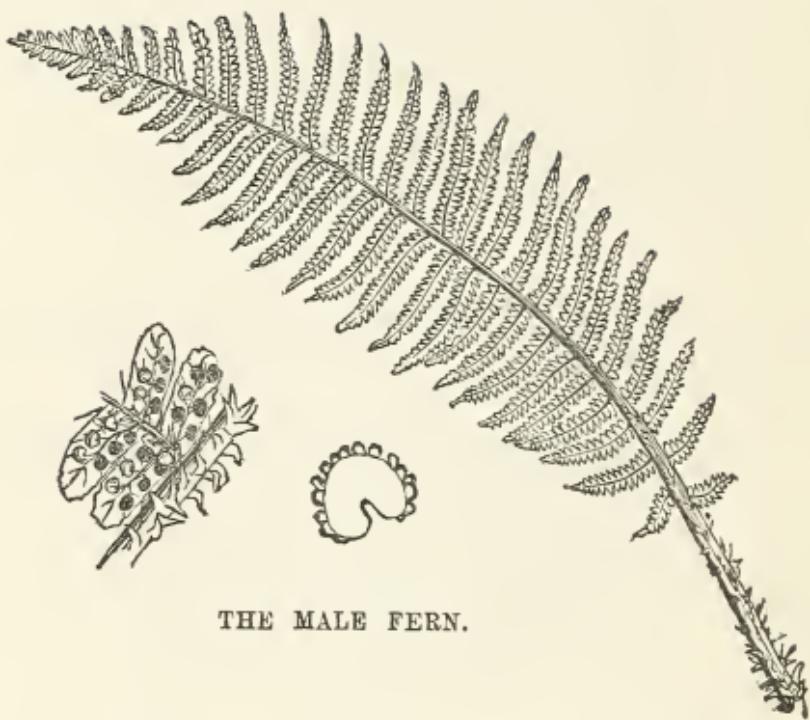


VAR. CRISTATA.

VARIETIES OF LASTREA OREOPTERIS.

NAMES	BY WHOM NAMED	BY WHOM FOUND	ELV D	WHERE FOUND	PROMINENT CHARACTER	REMARKS
alba-variegata	Barnes Wollaston	J. M. Barnes J. Westlake	1873 1881	Wastdale Staveley	plant white and green frond erect, narrow pinnae a fine form	a true variegation
angusta	Moore	G. Whitwell J. M. Barnes	1886 1865	Patterdale Swindale	acute, rounded fronds erect, very narrow distinct and good form	
angustifrons	"	" " "	1865	Mardale	multifid	
apuiformis	"	" "	1865	Swindale	caudate and crested	
attenuato-cristata	Barnesi	"	1865	Patterdale	fronds erect, & every narrow	this remarkable plant is unique
breviloba, Forster breviloba	Barnes Moore	W. Forster J. M. Barnes	1881 1864	Mardale	many of pinnules wanting an irregular form	
caudata	"	J. K. Hodgson	1868	"	pinnules evenly reduced	a distinct and beautiful variety
caudato-cristata	Barnes	W. Crouch	1863	Rydal lake	fronds and pinnae very caudate, with small robust crests	found also at Wastdale, by date
concinnata	"	"	1866	Longrigg Langdale	points of pinnule like ringlets a beautiful form	Mr. J. K. Hodgson
congesta	"	J. M. Barnes	1873	"	fronds densely foliose, &c a fine form	habit
coronans	Moore	" "	1872	"	heavily crested	unequalled as a crested
crispa	"	J. A. Wilson	1865	Furness Fell	"	form of montana
erispatisima	Wollaston	J. Huddart J. Gott	1971	Langdale	pinnules undulated	very striking in aspect
eristata	Clowes Hartley Col. Jones	J. Stewardson	1880	Windermere Troutbeck	"	unfortunately this plant
erispatisima	Gott		1880	Clougha		is dead
erispata	Barnes	Bell	1880	Coniston	pinnae digitate	rather inconstant
erispata	"	W. Forster	1882	Patterdale	erispate, densely foliose	a splendid form
erispata	"	J. M. Barnes, Jr.	1887	Coniston	fronds narrow & erispate	a good form
erispata	"	T. Hartley	1879	Wyresdale	pinnae, erispate, foliose	undulate & crispy
erispata	"	J. Garnett	1889	Grasmere	fronds narrow & erispate	one of the best of its type
erispata Bell	Whitwell				fronds narrow & erispate	distinct and pretty
" angustata					fronds, pinnae, erispate, foliose	a fine form
" congesta					fronds erect and narrow	very pretty form
curtum					fronds, and pinnae heavily crested	one of best cristaed forms
corymbiferum						
curvata Whitwell	Barnes	G. Whitwell	1887	Coniston	pinnae curved downward	a good form
curvata	Moore	J. J. Jones	1883	Farleton Knot	pinnae curved downward	distinct and good variety

<i>decurrens</i>	"	Barnes	T. Hartley J. J. Smithies G. Whitwell F. Gowers G. Whitwell	1866 1881 1888 1888 1886	" Coniston Patterdale Longsleddale near Bowness Brothers-water	pinnules decurrent pinnæ & fronds digitata fronds irregular fronds defective pinnules deformed fronds and pinnæ caudate a very neat form forked	very anomalous in aspect a neat form a defective form a strange looking plant rather inconstant
<i>digitatum</i>	"	"	"	1879	Frostrow Hawkshead	pinnules finely incised	fronds & pinnæ furcillated distinct and pretty
<i>deficiens</i>	"	Wollaston	Jos. Wiper	1889	"	fronds & pinnæ counterpart, of polystichum ang. var. gracile	counterpart, of polystichum ang. var. gracile
<i>erosa</i>	"	Moore	Forster Moore	1886	Martindale Levens Park Swindale	fronds and pinnæ crested a distinct & good variety	a distinct & good variety
<i>furcillata no. 1</i>	"	Wollaston	"	1861	Langdale	pinnules unevenly reduced an irregular form	best of interrupted forms
<i>furcillata</i>	"			1864	Mardale	pinnules much reduced	best of interrupted forms
<i>gracilis</i>				1872	Coniston	pinnæ, &c., very irregular	a strange-looking plant
<i>grandiceps</i>				1865	Hartsop	pinnæ, &c., defective	not at all handsome
<i>interrupta</i>				1886	Cautley	fronds & pinnæ interrupted	an irregular variety
<i>Barnesii</i>				1893	Hartsop	fronds and pinnæ unequal very striking in aspect	fronds and pinnæ unequal
<i>interrupto-laciniatata</i>				1882	Cantley	pinnæ acute	a robust form
<i>laciniato-caudata</i>				1879	Langdale	pinnæ unequal	an irregular form
<i>interrupta crispa</i>				1882	Seathwaite	pinnules broad overlapping	a robust plant
<i>inaequalis confusa</i>	"			1873	Garsdale	almost tripliniate	a very fine form
<i>acutiloba</i>	"			1872	Coniston	apex of frond multifid	a pretty variety
<i>no. 1</i>	"			1879		fronds many forms	a fine robust grower
<i>latifolium</i>	"			1885		pinnæ forked apex of frond a distinct and good form	a robust
<i>lobata</i>	"					not forked	form
<i>multifida</i>		Barnes	J. M. Barnes	1879	Clogha	frond & pinnæ multifid	a pretty variety
<i>multiformis</i>		Moore	J. K. Hodgson	1876	Little Langdale	finely cut, barren	a splendid form
<i>multifurcata</i>		Barnes	G. Whitwell	1873	Langdale	fronds and pinnæ tasselled	a good variety
<i>Whitwell</i>		"	G. S. Whitwell	1879	Clogha	fronds and pinnæ tasselled	a good variety
				1885	Potterfell	finely cut, foliose, barren	best of plumosum form
					Potterfell	pinnæ marginate & cristaed	a very remarkable form
					Coniston	pinna like ringlets	plant crispy in aspect
					Wastdale	pinnæ undulated	a remarkable sport
					Mardale	aspect of Polypodium	Vulgare
<i>stricta</i> Whitwell		Barnes	Jos. Stewardson	1879	Cautley	fronds erect, very narrow	distinct & beautiful variety
<i>serrulata</i>		Barnes	T. Airey	1876	Troutbeck	pinnæ serrated	good form
<i>serrulata</i>		"	Mrs. Hodgson	1875	Garsdale	pinnules unevenly reduced	distinct & robust grower
<i>variegata</i>		"	J. Stewardson	1875	Swartfell	green and yellow	so far true



THE MALE FERN.

THE COMMON BUCKLER OR MALE FERN.

*Lastrea Filix-mas.** — PRESL.

The Male Fern is so called from its robust appearance in contrast with the more delicate though similar Lady Fern (*Filix-fœmina*). It is an annual except in sheltered spots, where the old fronds will continue green until the new come out. One of the commonest of our Ferns; it is yet one of the most beautiful, especially on account of its coronal growth, like a circle of erect but gracefully-waving feathers springing from one stem, the fronds smooth, of a lively green, somewhat paler underneath, averaging a height of from two to three feet, but varying from twelve inches to even six feet according to age, variety, or locality. The stipes is short, stout, and densely scaly. The fronds are broadly lance-shaped; bipinnate, though less decidedly so than some other species, only those pinnules which are nearest the main rachis being

* *Polypodium Filix-mas* (*Linnæus*), *Aspidium Filix-mas*, &c

quite separate; the pinnæ are narrow and tapering, with a few of the lowest pinnules distinct, the rest united at the base,—these pinnules of an obtusely oblong form and serrated, or notched, on the margin. The sori are usually confined to the lower half of the pinnules, but they are very crowded and abundant.

This is one of the best of our Ferns to be studied in order to understand the fructification, for here the indusium, in almost fully developed fronds, is remarkably prominent, closed over the spore-cases and seen to consist of a lead-coloured tumid kidney-shaped scale, which in due time is raised on one side for the dispersion of the spores. This may be seen by watching the fronds just as they are reaching their full growth. The veins also of this species are very manifest, each pinnule having a flexuous midvein, with alternate venules, simple, forked, or sometimes three-branched in different parts of the pinnule, the three-branched occurring at the base and the unbranched at the apex. The sori are borne on the branch toward the apex of the pinnule and form a line of dots on each side of the mid-vein and at a little distance from it.

The variety *L. INCISA* is a magnificent Fern, growing much larger than the commoner typical form of the plant, with the same general features, only larger in every part, its pinnules, more elongated and tapering, more deeply cut along their margins, the branchings of its venules more numerous, and its sori covering a larger surface, reaching almost to the apex of the pinnules. Another variety, *L. F.-MAS var. paleacea*

of Moore. *L. PSEUDO-MAS*, of Wollaston, is remarkable for the abundance of its usually-golden coloured scales, clothing its stipes and rachis. Most forms of this section are very distinct and permanent.

Another variety, *L. F.-MAS var. abbreviata* of Moore, (*L. PROPINQUA* of Wollaston) is a sub-Alpine plant easily known by its thinner texture, smaller size, and the more shining surface of its pinnules. The necessity for elevating this and the foregoing *variety* into species or sub-species, is becoming more apparent every year; the *vars.* of these *vars.* having already become almost as numerous as those of the specific form. The chief objection to this is, that occasionally a plant is met with, on which it is impossible to decide with certainty to which section it belongs. Such plants however are of rare occurrence.

The typical Male Fern, also its incised and golden-scaled varieties, may be found, though not at any very great elevation, over the whole of British ground and throughout Europe from Scandinavia to the Isles of Greece. In Asia it extends from the Caucasus to Lake Baikal, and from the Ural Mountains to the Himalayas and to Assam. It is found also in Northern Africa and Madeira. And in the Americas, in Newfoundland and in Mexico, from California to Peru and Brazil. But, it is said, not in the United States. Its culture is not at all difficult; it will grow in any sandy places, in almost any kind of soil, the best a sandy loam, moist but not wet.

The Male Fern has long had and still retains a medicinal reputation as a specific against tape-worm,

Galen used it; Pliny also, who also called it *Filix-mas*. Its astringent stems have been employed in tanning leather, and its ashes in bleaching linen, and making glass and soap. Bishop Gunner speaks of the young curled fronds being boiled and eaten like asparagus, and says that the poor Norwegians cut off the succulent laminæ at the crown of the root (the bases of the future stalks) and, adding a third portion of malt, brew from them a kind of beer. In times of great scarcity they mix them with their bread. Cut green and dried in the air, this Fern, like the Bracken, is used in Westmorland and Cumberland as litter for the cattle; and if steeped in hot water would, it is said by the bishop, be a not despised but readily-eaten and fattening food — for the cattle as well as the Norwegians. The young crosier-like stems were of old called St. John's hand or 'lucky hands,' considered to be preservation from witchcraft.

This may be said to be the most common Fern of the Lake District, for it abounds everywhere, and adds materially to the beauty of every landscape. Its varieties are many, and some of them beautiful, but are much less frequently met with than those of the *Athyrium Filix-fœmina*, the *Polystichum angulare*, or the *Scolopendrium vulgare*; of these varieties the Lake Country has yielded far beyond its share, both in number and excellence. In the typical form few, if any, can compare with the beautiful and symmetrical *Barnesii*, found near Milnthorpe; or, in the *paleacea* type, the truly elegant form called *Pinderi*, found at Elterwater; or in the *abbreviata*

type, the delicate and graceful crested forms found in Langdale and Borrowdale.

No Fern can be more easy of cultivation, for it will grow in any soil or situation, and will flourish under circumstances where many other Ferns would droop and die.

VARIETIES OF LASTREA FILIX-MAS.

NAMES	BY WHOM NAMED	BY WHOM FOUND	DATE	WHERE FND.	PROMINENT CHARACTER	REMARKS
acute furcata	Barnes	J. Bolton	1873	Borwick Moor	fronds very acute and cristaed	a neatly crested form
attenuato-multifida	Wollaston Moore	J. M. Barnes	1864	Mardale	pinnules narrow, finely cut	a very beautiful form
Barnesii	"	F. Clowes	1861	Heversham	frond narrow, pinnules broad	not many to equal this
Clowessii	"	J. K. Hodgson	1859	Trotbeck	frond and pinnae digitate	a robust and fine form
crispata	Barnes	W. Crouch	1864	Coniston	plant crispy	a showy variety
crouchii	"	W. Martindale	1864	Rydal	loose spreading crests	strong growing plant
cristata Martindalei	Wollaston Barnes	H. Ruttleidge	1870	Wimster	"	synonyme var. Ivery-
cristata Ruttleidgei	"	T. Airey	1873	Old Hutton	"	an elegant form [anum]
densa	Whitwell Barnes	A. Barnes	1876	Patterdale	congested	a remarkable form
digitata Barnesii	"	J. J. Jones	1888	Burneside	fronds and pinnae digitata	a strong growing form
digitata Jonesii	Mrs. Stewardson	Mrs. Stewardson	1860	near Burton	fronds and pinnae digitata	a strong growing form
digitata Stewardsoniae	"	J. Crossfield	1875	Lancaster Moor	pinnules short and broad	free-grown elegant form
excurrens	Moore		1862	Silverdale	frond and pinne ending with	found also by J. A. Mar-
gracile	Barnes	Mrs. Hodgson	1873	Seathwaite	a horn	tindale, at Staveley
gradiiceps	Sim	T. Wearing	1862	Warton Crag	pinnules narrow & finely cut	a strong growing form
inflexum	Barnes	J. A. Barnes	1888	Ambleside	crested, large spreading head	grand but not graceful
interrupta Aireyi	"	T. Airey	1874	Windermere	pinne, like ringlets	robust & grand form
interrupta Clowessii	Moore	F. Clowes	1878	near Bowness	interrupted	a good form
multiformis	Barnes	J. M. Barnes	1871	near Ullswater	pinnules very irregular	a curious sport
polydactyla Jonesii	"	J. J. Jones	1860	near Burton	fronds all manner of forms	most ungainly-looking
polydactyla Barnesii	"	J. M. Barnes	1865	Whitbarrow	crested	plant fronds 3ft or more in
producta	J. Crossfield		1862	Silverdale	crested — very robust	[length
ramosa Aireyi	T. Airey		1875	Red Bank	pinnules large and incised	modification of common
paleacea	Moore			common	ramose and crested	very fine form. [incisa
{ L. PSEUDO-MAS						uniform & pretty plant
crispata	Wollaston	J. M. Barnes	1863	near Levens		
"	Barnes	"	1865	Mardale		
crispata	Wollaston	J. A. Wilson	1871	Langdale		
"						unlike any other crested
"						form
"						pendulous



THE REMOTE BUCKLER FERN.

THE REMOTE BUCKLER FERN.

Lastrea remota. — MOORE.

This Fern — the *Aspidium rigidum* or *remotum* of Braun, makes its first appearance in England in the Addenda to Mr. Moore's "Nature Printed British Ferns" published in 1863, having been discovered in the neighbourhood of Windermere, by Mr. F. Clowes and Mr. Huddart in 1856. It has previously been only known as a native of Southern Germany. Braun inclines to regard it as a mere divided form of the Common Male Fern, but Moore claims for it the rank of a species. In general character and aspect it much resembles those vigorous examples of *L. cristata* var. *spinulosa* which are sometimes met with having the same narrow elongate erect fronds; but in its structural characteristics it differs materially from that plant and agrees much more closely with *L. Filix-mas*. From *L. Filix-mas*, the incised pyramidal-pinnuled forms of which most nearly resemble it, it must however be separated on account of the farther divisions of its fronds, which are tripinnate. In *Filix-mas* also the serratures of the lobes are often acute, while in *remota* they often terminate abruptly in a hard short point, being what is called mucronate, still oftener mucronulate, thus forming the intermediate step between *Filix-mas* and *L. dilatata*, which is mucronate and spinulose. Mr. Clowes, who has carefully culti-

vated and observed it, considers it to be a hybrid between *L. Filix-mas* and *L. cristata* var. *spinulosa*.

The caudex of *L. remota* is stout and ascending, with a thick scaly crown; its stipes, a foot long, is stout, and clothed with numerous scales of various size, some ovate-acuminate, three-quarters of an inch long, others smaller, lanceolate or linear, terminating in a lengthened hair-like point, the margin slightly wavy or toothed,—along with these larger scales numerous others occurring, minute, ovate caudate, and peltately attached; the rachis, both primary and secondary, is furnished with scales which become smaller upwards.

The fronds, from three to four feet high, are erect narrow oblong lanceolate, sub-tripinnate, and smooth; the lower pinnæ three to four inches long, ovate-acuminate, all ascending, opposite or sub-opposite and distant below; pinnules (basal ones of second pair of pinnæ) an inch and a quarter long, shortly petiolate, pyramidal, or pyramidal ovate, acute, pinnatifid, almost pinnate; lobes oblong, about three-quarters of an inch long, obtuse, the lowest sub-lobate at the base, otherwise serrated, the serratures most numerous and prominent at the apex, acute, mucronulate. The pinnules become gradually less pyramidal or ovate, and more oblong, at length linear oblong, as they recede from the main rachis; below, except the lowest, they are also sessile, narrowly attached, but gradually more and more adnate upwards. The pinnules of the upper pinnæ resemble the smaller pinnules of the lower.

THE CRESTED BUCKLER FERN.

Lastrea cristata.* — PRESIL.

Lastrea cristata, *L. uliginosa*, and *L. spinulosa*, constitute a group distinguishable by habit and other characters from the allied *dilatata* group, with which the more highly-developed form *spinulosa* is sometimes associated. “In our ‘Handbook of British Ferns (2nd ed.)’,” says Moore, “this group was treated as consisting of three forms of one not very variable species; and notwithstanding that many fern authorities do not appear to adopt this view, we have no doubt whatever that the plants possess a close natural affinity, and have characters which separate them from the forms of *Lastrea dilatata*, however similar to the latter, in some cases, may be the degree and mode of division in the fronds—points on which botanists are at times too prone to rely. The close affinity of the three forms now alluded to is evidenced by marks far more important than those to be derived from such characters as the outline or cutting of the fronds, namely, by the creeping caudex, by the erect narrow fronds, by the sparse and pallid broad appressed scales of the stipes, and by the

* *Polypodium cristatum* (*Linnæus*).

entire indusia, in all which respects they perfectly agree. On the other hand, it is in these points that they differ from the *dilatata* group. In the folio edition of this work, we were led, in deference to the more commonly received opinion, to treat of *spinulosa* separately; but after some years' further observation, we revert to our former view, and place it here under *cristata*.”*

To this it may be well to add the special distinctions which characterize the whole group of what were once called Crested Shield Ferns — *L. cristata*, *uliginosa*, *spinulosa*, *dilatata*, and *œmula*, although *L. cristata* is only known in the Lake Country by its variety *spinulosa*, — the true Crested Buckler Fern and var. *uliginosa* occurring only in more southern counties.†

Lastrea cristata grows with very erect, narrow, oblong fronds, whose deltoid pinnæ are not quite divided down to the midrib, the lobes being attached by the whole width of the base, and oblong, with a rounded apex. The stipes is sparingly furnished with broad, obtuse, membranous, white-coloured scales; and the caudex is creeping.

Lastrea uliginosa has two or three sorts of fronds. One set, the earlier barren ones, resemble those of *cristata*, the fertile being bipinnate at the bases of the pinnæ; the fronds narrow-oblong, the lobes tapering

* *Nature-Printed British Ferns*, octavo edition, 1863.

† *L. cristata* has recently been reported from Grasmere, by Mr. J. Robinson, of Rydal. There is, however, a possibility that at some time it may have been planted there.

to a point. The scales of the stipes are broad, blunt, and whole-coloured, and the caudex is creeping. This connects *cristata* and *spinulosa*.

Lastrea spinulosa grows erect; has narrow, lance-shaped, bipinnate fronds, rather more deeply divided than the foregoing. The scales of the stipes are blunt and whole-coloured, and the caudex creeps.

Lastrea dilatata spreads more, and has broader or ovate lance-shaped fronds. The stipes is clothed with lance-shaped scales, darker coloured in the centre than at the margins. The caudex is erect.

Lastrea œmula is spreading, evergreen, and has fronds smaller than those of *dilatata*, triangular, bi-pinnate, the lobes having their edges curved back so as to present a hollow upper surface. The scales are narrow, pointed, and jagged; and the caudex is erect.

The Narrow Prickly-Toothed Buckler Fern — L. SPINULOSA (sometimes *spinosa*) — has a stout stem, or caudex, either decumbent or slowly creeping horizontally, with the fronds growing erect from its apex; the fronds branched, sometimes tufted, slightly scaly, formed of the enlarged and enduring bases of the decayed fronds, surrounding a woody axis, the scales resembling those of the stipes. The fronds are from a foot to three or four feet high, bipinnate, the pinnæ obliquely tapering, the inferior pinnules being larger than the superior. This is most obvious at the base of the frond, where the pinnæ are broader than they are toward the apex. The lower pinnules on the basal pinnæ are oblong, narrowing upwards, the margins deeply cut, the lobes being serrated, and the teeth

somewhat spinulose; those toward the apex of each pinna, as well as the basal ones of the pinnæ nearer the apex of the frond, become gradually less and less compound, so that, although the margins are still furnished with spinulose teeth, they gradually lose the deep lobes which are found on the lowest pinnæ. In all the more compound Ferns there is a similar difference of form according to the disposition of the pinnules, and in all such cases it is usual only to describe the most complete — that is, those at the base of a few of the lowermost pinnæ. The venation in the less divided pinnules consists of a midvein giving off branched venules, the sori borne on the lower anterior venules proceeding from these, about midway between the vein and the margin, thus forming an even double row on each pinnule. The same arrangement occurs on the lobes when the pinnule is more divided. The indusia are kidney-shaped, with the margin entire.

L. spinulosa is common over the whole of England, generally in moist shady places, ranging from the sea-level to an elevation of 600 feet. In Scotland, Wales, and Ireland it is rare. In the Lake Country it is common in bogs and damp woods throughout the district.



THE BROAD BUCKLER FERN.

THE BROAD PRICKLY-TOOTHED BUCKLER FERN.

Lastrea dilatata.—Presl.

The Broad Prickly-Toothed Buckler is one of the most compound and handsome, as well as one of the most common, of our native Ferns, growing in broad arched fronds, from a large tufted stem, to, when most luxuriant, even the height of five feet, always more or less drooping or curved. It is a species very difficult to understand, on account of its many varieties, — some of which pass almost into *L. spinulosa* on the one side, and others into *L. æmula* on the other. The distinguishing characteristics, however, of *L. dilatata* in the group of Crested Shield Ferns, of which it forms a very large proportion, are its lance-shaped dark-centred scales and its gland-fringed indusia. The following description applies to the more usual or typical form of *dilatata*.

Fronds ovate, lance-shaped in general outline, on a stipes of moderate length much thickened at the base and densely clothed with entire lance-shaped pointed scales very dark brown in their centres but nearly transparent at their margins; bipinnate, with elongate-triangular, or tapering, pinnæ, placed nearly opposite,

and more or less obliquely from the larger development of the lower side. Pinnæ pinnate, pinnules near their base often so deeply divided as to be again almost pinnate, the rest pinnatifid or in the upper parts merely deeply serrated, but the margins, whether deeply or shallowly lobed, set with teeth ending in short spinous points. Venation similar to the more compound parts of the allied species. Sori in great plenty, ranged in double lines across the larger lobes of the pinnæ or along the less divided parts, and covered with kidney-shaped scales or indusia fringed round their margins with projecting glands.

The typical form of *L. dilatata* grows nearly all over the United Kingdom, from the coast-level to an elevation of 3,000 feet. It prefers shady situations, moist woods and glens, thickets and hedgerows. It is widely dispersed through the northern hemisphere, and in the Hookerian Herbarium there is a specimen labelled 'from New Zealand.' It is common everywhere throughout the Lake District.

L. dumetorum is a distinct variety of *dilatata*. Its type may be taken from one found by Miss M. Beever, dwarfish, with broad-ovate or elongate-triangular and sometimes deltoid fronds, remarkable for their glandular surface, and for the large abundant sori produced freely on plants of a very immature age. Some of its modifications have been referred to var. *collina*, from which, however, they differ in their abundant glands and fimbriated or jagged scales. Miss Beevor's plant was found on the fells of Tilberthwaite, Coniston, and the same form has been gathered by Mr.

Clowes, near Hawes-water, and by the Rev. G. Pinder, near Elter-water.

L. collina is another distinct and permanent variety, a remarkably elegant plant, growing erectly, the frond having sometimes an ovate outline attenuately elongated at the apex, sometimes more elongated, oblong-lanceolate or ovate-lanceolate, dark green, a foot to two feet high, smooth or sparingly glandular, bi-pinnate. The stipes varies from one-half to one-third of the frond, green above, tinged with dark purply-brown at the base, with entire lanceolate dark-brown scales, conspicuously darker in the centre. The scales narrow, with a long subnate point, at the base of the stipes, where they are more numerous, broader and shorter higher up; the rachis almost without. The pinnæ, especially the lower, distant and spreading, the lowest pair unequally deltoid, the next more elongate and less unequal, the rest narrower, parallel-sided, rounding slightly near the end to an acutish point, and acuminate. Pinnules convex, obtusely oblong-ovate, the basal narrowed to a broadish stalk-line attachment, the rest sessile and more or less decurrent; the larger pinnules deeply pinnatifid, with blunt oblong lobes, sparingly toothed, the teeth coarse acuminate aristate (or bearded), mostly at the apex. Sori mostly arranged in two lines along the pinnules, as in the smaller forms of the species, and covered by gland-fringed indusia. This variety was first brought into notice by the Rev. G. Pinder, found at Elterwater, in Langdale, and by Mr. Ecclestone at Torver, near Coniston. This last is rather larger and more

divided, with concave pinnæ and strongly convex pinnules ; it is also somewhat glandular.

L alpina is remarkable for being more delicate and membranaceous than other forms of the species ; the fronds normally oblong, or straightsided, with the point tapering off as in the typical *spinulosa*, but in some specimens even broadly ovate, almost or quite tripinnate below, bipinnate upwards. Found by Mr. Clowes at Hawes-water.

VARIETIES OF LASTREA DILATATA.

NAMES	BY WHOM NAMED	BY WHOM FOUND	DATE	WHERE FOUND	PROMINENT CHARACTERS	REMARKS.
<i>alpina</i>	Moore	several		Mardale	pinnæ and pinnules thin and finely cut	grows on most of the high mountains pretty but defective in outline
,, <i>contracta</i>	"	J. M. Barnes	1864		fronds leafy reduced	a strong-growing form
<i>alta</i>	J. A. Martindale	1864		Staveley	pinnae distant	
<i>collina</i>	Miss Beever			Coniston	a defective but fine form	
<i>Cronchii</i>	W. Grouch	1964		Loughrigg		
<i>erecta</i>	T. Airey	1876		Kirkstone	a fine variety	
<i>densa</i>	J. M. Barnes	1865		Witherslack	a fine leafy form	
<i>dumentorum</i>	several			many places	not uncommon	
<i>foliosa</i>	T. Airey	1878		Bayrigg Wood	pinnules cross-shaped	
<i>glandulosa</i>	F. Clowes			Windermere	fronds densely foliosæ	
<i>granddens</i>	Barnes			Lindale	fronds short, surface granular	
	Moore				very leafy	
<i>interrupta</i>	J. Crossfield			Patterdale	covered with stalked glands	
<i>Aireyi</i>	T. Airey	1876		Witherslack	pinnae broad, plant	
<i>Barnesii</i>	J. M. Barnes	1865		Loughrigg	leafy	
<i>Crouchii</i>	W. Grouch	1864		Witherslack	evenly interrupted	
<i>irregularis</i>	J. M. Barnes	1862		"	pinnae reduced	
<i>laeñata</i>	"	1865		"	"	
<i>Barnesii</i>	"			"	pinnae &c., irregular	
	Barnes			"	pinnae and pinnules any shape	
	a boy			"	not at all handsome	
				"	"	
				"	any a remarkable sport	
<i>micromera</i>	1862					
<i>parvipes</i>	1871					
<i>pentagona</i>						
<i>setigera</i>	J. M. Barnes	1864		Broughton	pinnules finely cut, &c.	
<i>Forsterii</i>	Wm. Forster	1890		Grange	fronds and pinnae with small crests	
<i>stenophylla</i>	J. M. Barnes	1862		Crosthwaite	pinnules finely cut, &c.	
<i>tenera</i>	F. Clowes			Deepdale	contracted pinnae marginated, bristle like teeth	
	"			Witherslack	frond narrow, very finely cut	
				Windermere	finely cut	
						has the aspect of an Athyrium
						a neat and pretty form

THE HAY-SCENTED BUCKLER FERN.

TRIANGULAR PRICKLY-TOOTHED, OR CONCAVE.

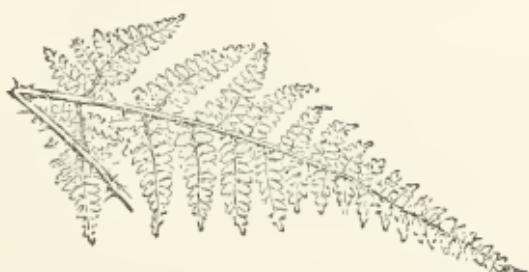
Lastrea æmula.—BRACKENRIDGE.

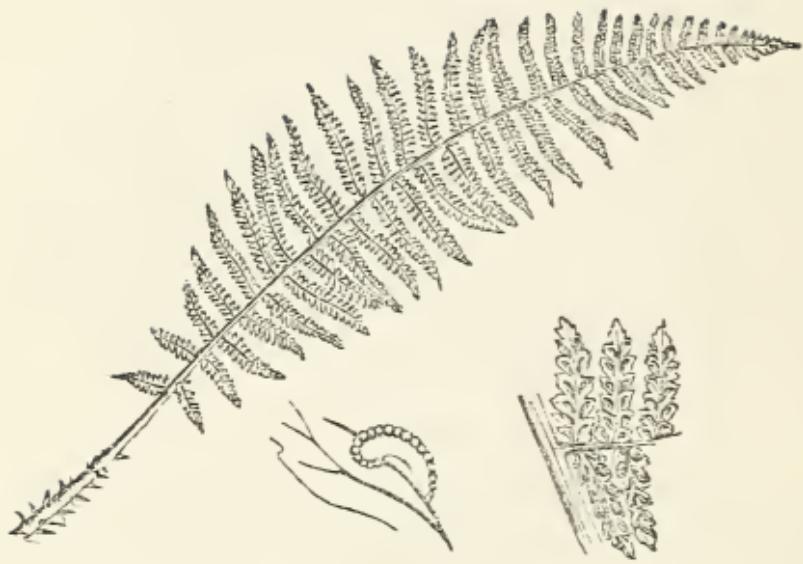
The Hay-scented Fern is a plant of from a foot to two feet in height, growing in a circle of triangular arched or drooping fronds with a crisped appearance, from the turning back of the margins of all the segments. Its fragrance is like that of new hay, like hay, too, more powerful as it dries, and lasting for a long time. Its stipes is of about the same length as the leafy portion of the frond, clothed with a jagged pale brown scales. The fronds are bipinnate, the lowest pair of pinnæ being always longer and larger than the rest, and the pinnules on the inferior side of the pinnæ always larger than those on the superior. The pinnules are oblong-ovate, the lowest again often divided into a series of oblong lobes, mostly decurrent, but sometimes slightly stalked, the margin cut into short spinous-pointed teeth. The veins of the pinnules alternately branch from a sinuous midvein, and divide again into two or three alternate venules, the lowest anterior venule bearing a sorus, the exact ramification of the veins depending on the degree in which the pinnules or lobes are divided. The sori are spread

over the whole surface, in two tolerably even lines along each pinnule or lobe. Indusia small and kidney-shaped, with uneven margins fringed by small round stalkless glands. The whole frond is covered with similar glands. By these stalkless, or sessile, glands, as well as by the fewer and narrower scales of the stipes, *L. æmula* is distinguished from *L. dilatata*—whose glands are stalked. In ordinary cases, the triangular outline and hollow crisped surface of the fronds are sufficient to distinguish the Concave Buckler Fern, which is also more decidedly evergreen, and has this further peculiarity, that the fronds decay from above downwards—not like the Broad Prickly-toothed Fern, upwards—from the base. Its range of elevation does not appear to exceed 600 feet. It prefers shady and rocky localities and is easily cultivated.

HABITATS.

St. Bees' Head, *J. Huddart*; Broughton, *J. M. Barnes*; Coniston, *Miss Beever*; Windermere, *F. Clowes*; Kirkby Ireleth, *J. K. Hodgson*; Furness Fell, *T. Hartley*.





THE LADY FERN.

THE SPLEENWORTS.

THE LADY FERN.

Athyrium Filix-fœmina.*—ROTH.

The genus *Athyrium* holds a place between the *Aspidiæ* (or Shield Ferns) and the *Aspleniæ* (or Spleenworts). Its generally elongated sori mark it, however, as belonging rather to the latter group, though there is a sufficient approach to the roundish kidney shape of *Lastrea* to account for its having been also attributed to the former. It is, nevertheless, not so like to *Lastrea* as to be mistaken for it, and is distinguishable also from the other *Aspleniums* by its annual fronds and its herbaceous texture.

The Lady Fern, so called because of the peculiar delicacy of its fronds contrasted with the masculine robustness of the Male Fern, grows like that in plume-circlets or coronals from the caudex, which in winter, whether close to the ground or a few inches above it,

* *Polypodium Filix-fœmina* (*Linnæus*), *Aspidium Filix-fœmina*, *Asplenium Filix-fœmina*, *Cystopteris Filix-fœmina*.

bears a tuft of incipient fronds, each rolled up separately and the mass nestling in a bed of chaff-like scales. In May and June they are developed, twenty or more being usually produced. In the summer a few more generally arise in the centre, the whole dying off in the autumn. The form of the fronds is lanceolate, more or less broad, the stipes scaly at the base and about a third of the length of the frond. The fronds are bipinnate, the pinnæ always lanceolate, more or less drawn out at the point, and always again pinnate, though sometimes with the bases of the pinnules connected by a narrow leafy wing, but not so much so as to render them merely pinnatifid. The pinnules, however, are more or less lobed or pinnatifid, the lobes being sharply toothed in a varying manner. The venation, owing to the delicate texture of the frond, is very distinct, consisting in each pinnule of a wavy midvein, with alternate and again alternate venules, on the anterior side of which, at some distance from the margin, is an oblong sorus. In the larger and more divided pinnules the venation is more compound, and more than one sorus is borne on each primary vein, which thus becomes a midvein with branches on a smaller scale. The sori are slightly curved, the basal very much so, being horse-shoe shaped; the indusia of the same form. This horse-shoe shape is made by the lateral lines of spore cases crossing the vein and then returning, and sometimes the indusia is circular all but a small notch, so somewhat resembling the fructification of *Lastrea*. One side of the indusium is fixed lengthwise to the side of the vein which forms

the receptacle, while the anterior one (that toward the midvein of the pinnule) becomes free, and is split into a fringe of hair-like segments.

The Lady Fern is common all over England and Ireland, less so in Wales and Scotland (in the Highlands at an altitude of 3,000 feet), but found in all our northern, western, and Channel Islands ; it is found also in one or other of its forms from Lapland to Crete, from the Ural mountains to Kamschatka, from the Mediterranean to India, from Abyssinia to Algeria, from Canada to British Columbia, and in the United States and South America. It is perhaps the most prolific in varieties of all our British species, the varieties being very marked, singular, and permanent. It is common everywhere in the Lake Country.

VARIETIES OF ATHYRIUM FILIX-FEMINA.

NAMED.	BY WHOM NAMED	BY WHOM FOUND	WHERE FOUND	PROMINENT CHARACTER.	REMARKS
<i>apiculatum</i>	Wollaston	G. Whitwell	1886 A	pinnæ narrow & caudate a very neat form	
<i>apæformæ Barnesii</i>	Barnes	J. M. Barnes	1870	pinnæ small & ovate pinnæ, &c., fish-shaped, uniform and very neat	
<i>attenuatum</i>	"	Mrs. Hodgson J. K. Hodgson Mrs. Hodgson J. M. Barnes Mrs. Hodgson	1867 1866 1873 1871 1866	pinnæ and frond fish-shaped [spores] not reproducible from rather Inconstant	
<i>Barnesii</i>	Wollaston Capt. Jones Moore Hodgson	"		pinnæ fan-shaped lowest pair of pinnæ very long	
<i>brachiatum</i>	Moore	J. M. Barnes "	1863 1865	pinnæ uneven in length an uncommon form pinnæ broad and con. a splendid variety	
<i>brachypteron caudigerum</i>	"	Mrs. Hodgson J. A. Wilson Mrs. Hodgson	1871 1871 1863	upper pinnæ crowded, confluent, &c " pinnæ thick, dense, and crispy	
<i>Hodgsonii</i>	Barnes	J. Crossfield J. M. Barnes T. Huck	1859 1863 1874	short fronded and crispy fronds long and crispy a robust and fine form pinnæ long and crispy a distinct and beautiful crested	
<i>Wilsonii</i>	"	"		pinnæ attenuated and a pretty plant	
<i>congestum</i>	Moore Barnes	"		fronds narrow and branched	
<i>crispatum</i>	<i>Barnesii</i>	J. M. Barnes	1865	fronds short and narrow a compact and neat plant	
<i>cristatum</i>	<i>Huckli</i>	"		[digitate]	
<i>cristat otenu</i>	Wollaston	J. M. Barnes	1861	frond narrow, but leafy an elegant form	
<i>curtum</i>	Moore	"		irregular; not pretty	
<i>Woodii</i>	Wollaston Barnes	J. Wood I. Stewardson	1865 1875	a fine variety [plant]	
<i>curvato-digitatum</i>	Capt. Jones Wollaston	I. K. Hodgson J. M. Barnes J. Crossfield J. M. Barnes	1874 1873 1862 1865	frond narrow, but leafy an elegant form	
<i>dactyliferum</i>	Moore	"		a defective form	
<i>defectum</i>	"			pinnae reduced	
<i>diffissum</i>	Barnes	W. Crouch I. Stewardson	1865 1874	pinnae very seiso	
<i>dispar</i>	"	"		defective and crested	
<i>laciniatum</i>	"			and multifid	
<i>multifidum</i>	"			"	
<i>eroso-multifidum</i>	"			"	

<i>seruum</i>		several places	pinnules as if eaten away a not very attractive
<i>exiguum</i>	J. M. Barnes	1873	fronds narrow
<i>exile</i>	"	1862	a neat form
<i>fimbriatum</i>	"	1863	a light and graceful var.
<i>flexuosum</i>	J. Crossfield	1862	pinnules very narrow
<i>foliose-multifidum</i>	A. B. Taylor	1863	broad and fine
<i>grandiceps Eastoni</i>	J. Easton	1874	bifidated
<i>Inaequale</i>	G. Whitwell	1888	fronds twisted and
<i>Extensum</i>	"	1890	flexose
<i>Pinnulum</i>	J. Stewardson	1891	pinnules broad, plant
<i>incongruum</i>	J. M. Barnes	1872	a sort of crested lati-
<i>interrupto-projectum</i>	I. Stewardson	1874	folium
<i>pinnum</i>	J. K. Hodgson	1967	a very fine sport
<i>Jonesii</i>	J. J. Jones	1864	an irregular form
<i>raciniatum</i>	G. B. Wollaston	1866	a robust grower
<i>raciniato-abruptum</i>	Mrs. Hodgson	1866	pinnules as if eaten away narrow fronded
<i>"-dissectum</i>	J. M. Barnes	1862	branched in all its parts strange-looking plant
<i>inciso-parvipes</i>	"	1862	a remarkable sport
<i>limbospernum</i>	Miss Wright		Frizzellae
<i>latifolium</i>	J. Wood		defective
<i>marinum</i>			fronds abrupt, lacinated
<i>medio-deficiens</i>	G. Whitwell	1889	a dwarf and rather
<i>Monkmanii</i>	C. Monkman	1860	irregular
<i>multifidum Baker</i>	Rev. W. T. Baker	1884	fronds irregular
<i>multiceps Barnesii</i>	J. M. Barnes	1873	pinnules evenly reduced
<i>multicuspis Barnesii</i>	"	1861	defective but pretty
<i>multifidum Barnesii</i>	Mrs. Hodgson	1874	fronds incised
<i>Hodgsonii</i>	"	1865	beautiful when mature
<i>tenue</i>	J. A. Wilson	1869	found also by J. Cross
<i>monilacervum</i>	J. M. Barnes	1866	field, at Arnside
			plants of tibi habit not
			very rare
			rather good variety
			fronds variable
			a neat form
			a pretty variety
			a robust and fine form
			thin in texture, crested
			pinnules finely cut
			fringed with hairs or bristles

Varieties of *Athyrium Filix-femina* — continued.

NAMES	BY WHOM NAMED	BY WHOM FOUND	WHERE FOUND	PROMINENT CHARACTERS	REMARKS
oxydens	"	C. Monkman	E. D. Trottbeck	fronds short, congested	not reproduced from sports
parvi-epitatum	Wollaston Moore	J. M. Barnes J. M. Barnes	Witherslack Arnside	small round crests evenly crested	a neat crested form
parvicesp	"	"	1863 1892	very finely ent. barren finely ent. subpinnose	" " splendid form
plumosum	Barnesii	T. Bolton F. Clowes	1863 1874	incisum type, crested	a fine form
polycupisii	Boltonii	Mrs. Hodgson I. Stewardson	1873	ramose densely crested	beautiful in form & habit
polydaetylum	Capt. Jones- Barnes	several	1873	large multilobed head	[form
pterophorum	Farnesii				often rather coarse in habit
ramo-crinitatum	Clowesii				awarded a 1st class certificate by R. H. S.
ramulosum					
rectangulare	Moore	Mrs. Wilson	1868	Bethleem Moor	
refractum	"	T. Bolton	1871	Grassington common	
rhaeticum	"			Trottbeck Potter Fell	abundant on the moun-
"				Staveley Head	tains
deflexum		F. Clowes	1863	Furness Fell	a most remarkable form
"		A. B. Taylor	1865		a rather good form
"		J. M. Barnes	1874		a robust form
multifidum	Barnes	J. Garnett			a remarkably fine form
flexuosum	Capt. Jones				
setigerum					
Stableri	Barnes	G. Stabler	1874	Mardale	flar
stipatum	Wollaston	G. S. Whitwell	1887	Banisterdale Head	sometimes rather irregu-
strictatum	Wollaston	T. Leighton	1896	Old Hutton	good form
strigosum	Sim	J. J. Jones	1864	Farleton Knot	
suberistatum	Wollaston	A. B. Taylor	1864	Burnoside	a very neat variety
suberistiforme	"	J. M. Barnes	1862	Whitbarrow	a neat little plant
subdepauperatum	Moore	F. Clowes		Windermere	a robust plant
subdigitatum					rather inconstant
sub-pinnosum	Capt. Jones	A. B. Taylor	1862		curious but remarkably
uncinum	Moore	Mrs. Hodgson	1870	Potter Fell	ugly
variable	"	J. M. Barnes	1861	Flan. Ulverston	
		J. M. Barnes	1861	Arnside	
				Levens Park	

ASPLENIUM LANCEOLATUM.

Lanceolate Spleenwort.—HUDSON

Fronds lanceolate, rigid, glabrous, bi-pinnate, pinnæ, ovate-lanceolate; pinnules ovate or obliquely ovate, blunt, lobed or toothed; the teeth coarse, angular, mucronate; rachis with slightly elevated margins in front, not winged, minutely scaly; sori short oblong, borne near the margin.

Caudex perennial, short, stoutish, erect, or decumbent, tufted, densely scaly, with elongately subulate shining brown cellulosely-striate scales, and having stout branched roots. Vernalation circinate. Stipes one-third or more of the length of the frond, dark chestnut-coloured below, this color extending along the back of the rachis, sparingly scaly; terminal and adherent to the caudex; rachis with a slightly elevated margin in front, and having few slender jointed hairs; the partial rachides winged and furnished with similar hairs. Fronds 3-12, occasionally 18 inches high, rigid, bright green, smooth, erect or spreading, lanceolate, bipinnate. Pinnæ narrowing from the base to the point, sometimes deflexed, scarcely stalked, sub-opposite or alternative; lower ones more distant

and shorter. Pinnules obovate, obliquely ovate, or dimidiately sub-quadrata, the anterior side most developed, more or less conate at the base; in large fronds pinnatifid below, with obovate sharply-toothed lobes, coarsely-toothed above, the teeth mucronate; in smaller fronds coarsely mucronately-toothed. Occasionally the lower pinnæ are longer; sometimes the fronds are narrow and only pinnate, with lobed pinnæ; and occasionally they are membranaceous. Venation (pinnules) consisting of a flexuous mid-vein; veins alternate, the lowest anterior directed to the principal lobe, the venules which proceed from it extending one into each tooth, but not quite reaching the margin; the other veins are forked or simple, and correspond in number with the marginal teeth; their termination is marked by a depression of the upper surface. Fructification dorsal, scattered over the whole surface. Sori indusiate, oblong, borne on the anterior side of the venules; that is, above the fork of the veins occupying rather the centre of the lobes than the centre of the pinnules; at first distant, but becoming confluent in irregular masses on the lobes, which gives them a sub-marginal appearance; occasionally they are set back to back on the venules. Indusium white, oblong, slightly irregular, and wavy on the free margin. Spore-cases globose. Spores ovate, angular, roughish.

This beautiful species was found in 1884, by the Rev. Mr. Baker, near Ulverston.



THE BLACK MAIDEN-HAIR SPLEENWORT.

THE BLACK MAIDEN-HAIR SPLEENWORT.

Asplenium Adiantum-nigrum.—LINNÆUS.

The true Spleenworts (so called from some old-time supposed virtue in curing diseases of the spleen) are small evergreens, known from all other of our native Ferns, except *Ceterach*, by the long narrow single sori lying in the direction of the veins which traverse the fronds,—*Ceterach* being distinguished from them by having the backs of its fronds clothed with brown scales, under which the sori are hidden. From their next neighbours, the *Athyriums*, they are known by the latter having hippocrepiform (or horse-shoe shaped) sori and the free margins of the indusia fringed, while in the *Aspleniums* the sori are not curved, and the margins of the indusia are but slightly jagged, if not quite entire. The Spleenworts, too, are evergreen; while the Lady Fern is deciduous. There are ten British species of *ASPLENIUM*—*fontanum*, *lanceolatum*, *Adiantum-nigrum*, *marinum*, *Trichomanes*, *viride*, *Ruta-Muraria*, *germanicum*, *septentrionale* and *A. Lancelatum*. Of these, *A. fontanum* does not belong to the Lake District, though there is a tradition of

its having inhabited Wythburn (found there by Hudson, about 1775) until exterminated by the 'greed of collectors.' Let the race take heed !

The Black Maiden-Hair Spleenwort is an evergreen, growing in tufts, and varying in height from three or four inches to eighteen or more, including the stipes, which is often as long as or longer than the leafy portion, except in stunted specimens. The stipes is of a shining dark purple. The fronds are either erect or drooping, according to situation, of a thick leathery texture, triangular, more or less elongated toward the point, bipinnate, sometimes tripinnate; the pinnæ pinnate, triangular-ovate and elongated at the point, the lower pair longer than the next above them ; the pinnules, especially on the lower pinnæ, again pinnate, the alternate pinnules deeply lobed and the margins sharply serrated. The veins are numerous, each pinnule having its distinct midvein branching into simple or farther-branching veins, on which the sori are produced near the junction with the midvein,—that is to say, near the centre of every lobe or pinnule. All the ultimate divisions of the fronds, as well as all the larger lobes, have midveins with these simple or branched venules. When young, the sori are distinct and of the elongated narrow form common to the genus, but, growing older, they spread till they often become confluent and cover the entire under-surface of the frond. The indusiam is narrow, its margin free and entire ; but it is soon lost being pushed away by the growing sori. This species is very variable : in dry and exposed places small and obtuse, in more

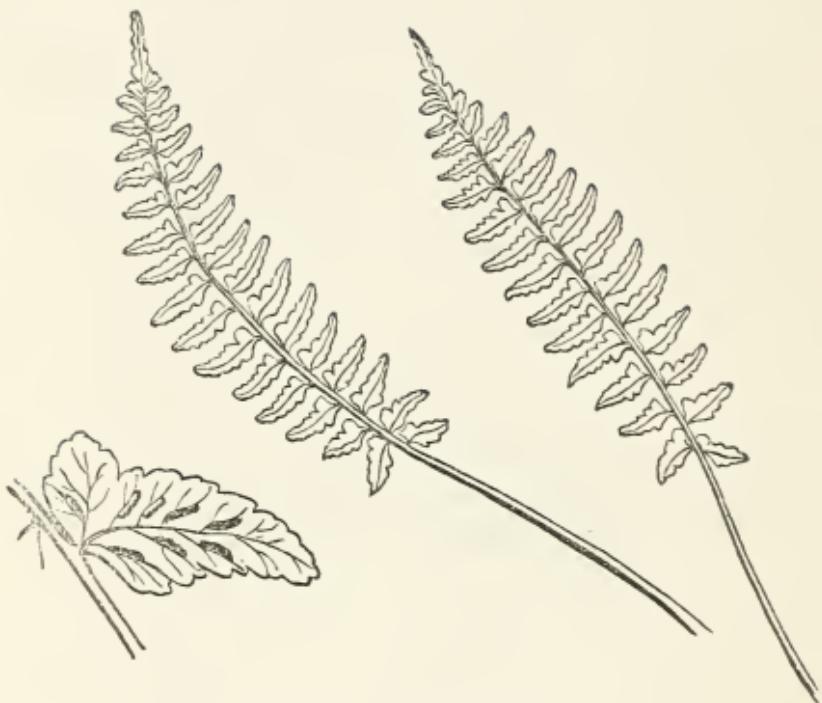
sheltered drawn out and elongated. These extreme states are ranked as varieties. Some have been found also with the fronds variegated with white. It seems to be nearly as common as the *Athyriums*, though not growing to so great an elevation, for it is found nearly everywhere, from Scandinavia to the Cape of Good Hope, in the Sandwich Islands, in Affghanistan, in Java, and in St. Helena. It thrives moderately well in cultivation if planted in a sandy soil and well drained; and is easily manageable as a pot plant, but requires a pure atmosphere. It is common throughout the Lake Country, either on the slate or limestone, often preferring old walls.

VARIETIES.

intermedium, — Heversham, J. M. Barnes.

depauperatum, — Windermere, F. Clowes.

acuti-dentatum, — Witherslask, J. Crossfield.



THE SEA SPLEENWORT.

T H E S E A S P L E E N W O R T .

Asplenium marinum. — LINNÆUS.

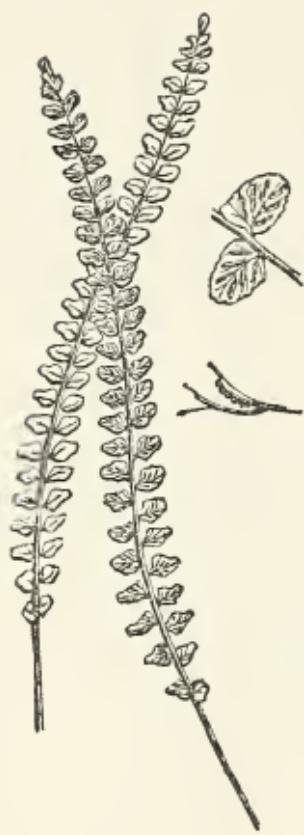
A sea-side Fern, as its name denotes, but occasionally found inland; a tufted evergreen species, erect or decumbent, the fronds growing usually six or eight inches long, linear or linear-lanceolate, of the deepest glossy green, and of a leathery texture, with a stipes shorter than the frond, smooth, channeled in front, chestnut-coloured or purply-brown. The fronds are simply pinnate, with stalked pinnae, connected by a narrow wing extending along the rachis; obtusely ovate or oblong, unequal at the base, the anterior base being much developed, while the posterior appears cut away, with the margin serrated or crenated. The venation is tolerably distinct: each pinnae has a mid-vein, giving off veins alternately on either side, branching again into a series of venules. The sori, lying obliquely on the anterior side of each venule, form two rows on each side of the centre; oblong or linear, with persistent indusia opening along the anterior margin as the spores ripen. The chief variation of the Sea Spleenwort consists in the elongation of its parts, the pinnae sometimes tapering to a narrow point, sometimes also being auricled at the base and deeply lobed.

It keeps very close to the sea-level. In cultivation it requires warmth, and grows best in sandy peat-soil in the interstices of stones or rock-work.

The Sea Spleenwort is most abundant on the west coast of Europe, extending, however, eastward in the Mediterranean. It is found also on the African coast, in the Western Isles, and, according to Sir W. Hooker, in St. Helena. This peculiar distribution has been supposed to indicate that it took place prior to the great disruption of the chalk and the vast deposit of alluvial matter along the eastern coast of England.

HABITATS.

Whitehaven, St. Bees' Head, Head of Morecambe Bay, Sea-cave near Silverdale, Piel Castle, Heysham.



COMMON MAIDEN-HAIR SPLEENWORT.

COMMON MAIDEN-HAIR SPLEENWORT.

Asplenium Trichomanes. — LINNÆUS.

The Common Maiden-hair Spleenwort is but a diminutive plant, yet it is one of the most elegant of the hardy evergreens, noticeable for the contrast between its purply-black stipes (and rachis) and bright green pinnæ, and for the regularity with which the latter are disposed. Its numerous small slender fronds, generally not more than from three to six inches long, though sometimes double that, grow in tufts in rock crannies and delight in the crevices of old walls. Its fronds are simply pinnate, the pinnæ small and numerous, equal-sized, roundish-oblong, attached to the rachis by a stalk-like projection of their posterior base, the margins entire or crenated (with convex or round teeth). The pinnæ are jointed to the rachis, and when old are readily displaced, leaving the black naked rachis among the other fronds. A distinct midvein passes through each pinnæ, branching on each side into veins and venules, the anterior bearing the linear sori just within the margin of the pinnæ. The sori, when young, have a thin indusium, with a rather round-toothed free margin, but when older become

confluent, and cover the whole frond. This also is a very universal Fern, found not only in the old and new world, but also in the newer world of Australia. It once had a medicinal reputation, and, according to Ray, was usefully employed in affections of the chest. It is also sometimes referred to in old medical books as the plant from which the syrup called Capillaire is produced. Turner, in his *Herball*, published in 1568, calls it 'English Mayden's Heare,' and says:—'the juice stayeth the heare that falleth off, and if they be fallen off, it restoreth them agayne.' It grows best in cultivation, in sandy loam with leaf-mould, and does not require so much shade as other ferns.

HABITATS.

Ambleside, Keswick, Borrowdale, Calder Bridge, and throughout the district.

The most beautiful of its VARIETIES is the *incisum*, with pinnæ deeply pinnatifid with linear notched segments. It has been found in Borrowdale by Miss Wright; in Lindale-in-Cartmel by Mr. A. Mason; at Ambleside by Rev. J. Bonney; in Langdale by Mr. G. B. Wollaston; and at Haverthwaite by Mr. G. Baini.

OTHER VARIETIES.

depauperatum, — Kendal Fell, J. M. Barnes; Whitbarrow, F. Clowes; Arnside, J. Crossfield.

bifurcum, — Windermere, F. Clowes; Arnside, J. Crossfield; Bardsea, Mrs. J. K. Hodgson.

multifidum, — Windermere, F. Clowes ; Keswick, Miss Wright ; Ulverston, Mrs. J. K. Hodgson.

ramosum, — Arnside, J. Crossfield ; Underbarrow, T. Hartley.

rotundato-multifidum, — Witherslack, J. M. Barnes.

Blechnoides, — Ulverston, Mrs. J. K. Hodgson.

corymbiferum, — Crosthwaite, J. M. Barnes.

liniare, — Whitbarrow, J. Robinson.

lotundatum, — Crook, J. Garnett.

THE GREEN SPLEENWORT.

Asplenium viride.*—HUDSON.

The Green Spleenwort has so close a resemblance to the Common Maiden-hair as to be often mistaken for it by hasty observers. It is distinguished by its green compressed rachis (that of *A. Trichomanes* being dark brown or black), by its persistent pinnæ (deciduous in *A. Trichomanes*), by the more central situation of its sori, which are placed rather below than above the vein-fork, and by being always of a much paler green and of a more delicate herbaceous appearance. It is an evergreen tufted species, with bright pale green fronds, narrow, linear, simply pinnate, from two to eight inches long, supported by a short stipe, dark at the very base, but else green, the rachis all green. The pinnæ are small, generally roundish-ovate, slightly taper toward the base, and attached to the rachis by the narrowed stalk-like part, the margin being deeply crenated. The venation is distinct: the midvein sends off alternately a series of venules, either simple or forked, which have the sori on their anterior side. The sori are oblong, covered at first by membranous

* *Asplenium Trichomanes ramosum* (*Linnæus*), *Asplenium intermedium* (*Presl*).

indusia, which are soon pushed aside; the free margin is jagged or crenate.

The Green Spleenwort is found in most moist, rocky, mountainous districts of Great Britain; it occurs also, though less frequently, in Ireland, and throughout Europe. It is to be cultivated in pots in a close damp frame; or on moist shady rock-work, if covered with a bell glass. If exposed, it is apt to suffer from occasional excessive wet, which often does not properly drain away; and also from the dry hot air of summer. The glass protects it from both these casualties, and provided it is not kept too close it will then thrive well. The proper bell-glasses for these half-hardy Ferns have a small opening in the crown, which may be closed or not at pleasure, but which is generally best left open. In pots, the plants should have a gritty, porous soil.

HABITATS.

Ambleside, Patterdale, Kendal Fell, *W. Christy*, ; Hutton Roof, Farleton, Arnside, *Rev. G. Pinder*, ; Casterton Fell, Mazebeck Scar, *R. B. Bowman*; Borrowdale, Ashness Ghyll, Barrow Force, Gillsland, Brandy Ghyll on Carrock Fell, Whitbarrow, &c.

VARIETIES.

multifidum, — Farleton Knott, J. Jones; Scout Scar, J. Crossfield, J. Wood.

subpinnatum, — Whitbarrow, J. Huddart.

varians, — Kendal Fell, J. M. Barnes.



RUE-LEAVED SPLEENWORT.

THE RUE-LEAVED SPLEENWORT,
OR WALL RUE.

Asplenium Ruta-muraria.—LINNÆUS.

This is a very diminutive Fern, growing, as its name implies, upon old walls, and very common on the limestone rocks, like the Rue in general appearance; sometimes not above an inch high, seldom in the most favoured situations reaching to the height of six inches. Its fronds are numerous, of bloom-covered (glaucous) green, usually triangular in outline, bipinnate, and with a stipes about half the entire length of the plant. The pinnæ are alternate, with rhomboidal, or roundish-ovate, or obovate pinnules, the base wedge-shaped, tapering into a more or less distinct petiole, the apex rounded or truncate, or sometimes acutely prolonged, always toothed with small or nearly equal teeth. The more luxuriant fronds become almost tri-pinnate, the pinnules deeply pinnatifid, and the lobes formed like the ordinary pinnules. When the plants are quite young, the fronds are simple and roundish kidney-shaped. At a later stage they are occasionally only once pinnate, with pinnatifid pinnæ. The upper margins of the

pinnules are irregularly-toothed. The venation consists of a series of veins repeatedly forked from the base, so that there is no distinct midvein; the number of the venules corresponds with the number of marginal teeth. Several sori are produced near the centre of the pinnæ, covered by indusia opening inwardly with a jagged or irregularly-sinuated margin. The plant is evergreen and easy of cultivation. It is so common that there is no occasion to give any special habitats. It extends to about 600 feet above the sea-line.

In its normal conditions *A. Ruta-muraria* is easily recognizable; the characters afforded by its triangular (deltoid) outline, bipinnate or tripinnate division, and distinct wedge-shaped pinnules, together with the smallness of the fronds, sufficiently distinguishing it from the other *Aspleniums*. There are, however, certain of its forms which are not, at first sight, so easily separated from *A. germanicum*, being narrow on the fronds or pinnules, and sometimes scarcely more than pinnate. These forms are best distinguished by the round-toothed (crenulate) indusia, and by the fine even toothing of the anterior margin,—the indusium in *A. germanicum* being entire, and the apex of its pinnules being less deeply and unequally notched.

VARIETIES.

unilaterale, — Troutbeck, Miss Wright; Kendal Fell, J. M. Barnes.

cuneatum, — Sizergh, J. Crossfield

dessicta, — Kendal Fell, G. Whitwell.

cristata, — Kendal Fell, G. Whitwell.

proliferum, — Underbarrow, J. Gott.



THE ALTERNATE-LEAVED SPLEENWORT.

THE
ALTERNATE - LEAVED SPLEENWORT.

Asplenium germanicum.—WEIS.

The Alternate-leaved Spleenwort stands between the Wall Rue and the Forked Spleenwort, sometimes indeed, marked as a dubious species, but decided by Moore to be perfectly distinct. It is one of the rarest of our Native Ferns, rare also in Northern and Central Europe. In other parts of the world it is not known. It is so rare here in Great Britain that Moore records only one single variety. Its altitudinal range is from 300 to 600 feet above the sea.

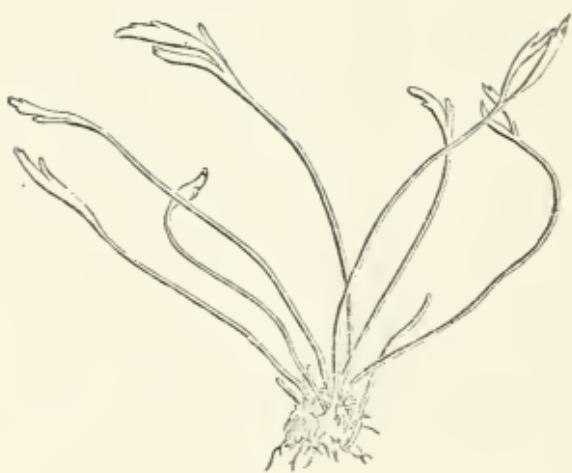
The Alternate Spleenwort grows in tufts, the fronds from three to six inches high, sub-evergreen (the fronds more or less persistent), narrow linear in general outline, pinnate, divided into distinct, alternate, wedge-shaped pinnæ, one or two of the lowest having generally a pair of very deeply-divided lobes, the upper more and more slightly lobed, all having their upper ends toothed or notched. The venation is very indistinct, on account both of the narrowness of the parts of so small fronds and of their opacity. There is no midvein, but one of the venules extends to each of the teeth, each vein entering from the base

becoming twice or thrice branched as it reaches the broader parts upwards, six or eight veins generally lying near together in a narrow fan-like manner in each of the larger pinnæ, the smaller having proportionably fewer. Two or three linear sori are produced on a pinna, covered by membranous indusia, the free margin of which is entire, or slightly sinuous but not jagged. The sori at length become confluent. It is very difficult of cultivation.

For the cultivation of *R. germanicum*, Moore (our chief authority) recommends that it should be potted in sandy peat soil, well drained by a mixture of rubbly matter (indeed, good drainage seems indispensable to almost all of the Fern kind); and that it should be kept under a bell-glass in a shaded frame or greenhouse. The plants are very liable to die in winter, the best safeguard from which is not to allow any water to lodge about the crowns, nor to keep the bell-glass too closely or too constantly over them.

HABITATS.

Borrowdale, *Miss Wright* and *H. E. Smith*; and near Scafell, *Rev. H. W. Hawker* in an excursion with *J. Huddart* and *F. Clowes*.



THE FORKED SPLEENWORT.

THE FORKED SPLEENWORT.

Asplenium septentrionale. — HULL.

This is another of the small and rare Ferns, though more widely distributed than *A. germanicum*, and growing to an elevation of 3,000 feet, tufted sometimes in large masses and grassy-looking, differing from *A. germanicum* (which some botanists consider a variety of it) by its fronds being either simple with mere lobes, or forked with two distinct branches, each like its own smaller fronds, and never being regularly pinnate as *A. germanicum* is. It is also narrower in its parts, with a thicker texture, and less leafy. The fronds are from two to six inches long, slender, and of a dull green; the stipes is rather long and dark purple at the base; the leafy part of the frond, hardly to be called leafy, is narrow elongated lance-shaped, split near the end into two or sometimes three alternate divisions, or, in the smaller fronds, into as many teeth, each of the divisions of the frond having its margin cut into two or more sharp-pointed teeth, the points of the larger teeth very frequently split again. The forked fronds are indefinite in form and apparently one-sided, one division being smaller than the other, and looking like a side branch with nothing to balance

it on the other side of the rachis. The lobes are sometimes so much separated as to look like distinct pinnæ. There is no midrib or vein, the rachis answering the purpose if the frond is not lobed, or else becoming forked so as to send up one vein to each of the teeth. Three or four long linear sori are crowded into this small space, so that when the ripening sori burst the indusia, they become confluent over the whole under-surface. This confluence of the sori over the whole under-surface has led some writers to consider this plant an *Acrostichum*. Others, from the sori being face to face in consequence of their growing on each side of the vein and almost close, have thought it a *Scolopendrium*, the mark of which is to have the sori confluent in pairs face to face. It has therefore been sometimes called *Acrostichum septentrionale* and *Scolopendrium septentrionale*. If the plant, however, be examined when young, it will be found to be a true *Asplenium*.

The Forked Spleenwort does not appear to be found in Ireland; but, though rare, has a wide range in Great Britain, from Devonshire to the Orkneys. It grows abundantly in some of the mountainous tracts of Central Europe, and extends from Russia and Scandinavia to Italy and Spain. In Asia it inhabits the mountain ranges of the Ural and the Altai, and is found from Northern India to the Caucasus. It occurs also in New Mexico. It prefers fissures of rocks, or between the stones of loose walls.

As in the case of the allied species (Moore again, in the octavo edition of his *Nature-printed British*

Ferns), many persons fail to cultivate this Fern with success; probably from the use of fine soil in too large masses. Naturally this is a rupestral (rock-growing) plant, and this condition should be imitated by its being planted among masses of porous sand-stone in the interstices of which, and only in the interstices, a little sandy soil should be placed. It would no doubt also be an advantage to plant somewhat horizontally instead of too vertically and to have the upper stones large enough to shade the crowns of the plants from the sun. Many Ferns do not need so much shade as is given in a collection to the tenderer sorts; and this partial shadowing would be more congenial to some of the wall or rock species than a more general exclusion of the sun.

HABITATS.

Scafell, by Wastwater, Honister Crags, Borrowdale, Newlands, Keswick, Helvellyn, Patterdale, Red Scree, Crummock Water, and Langdale.



THE COMMON HART'S TONGUE.

THE COMMON HART'S TONGUE.

*Scolopendrium vulgare.** — SMITH.

Scolopendrium forms a sub-group of the *Asplenieæ* in which the sori, instead of being simple and distinct, are brought together in opposite pairs, so that what appears to be a line of spore-cases forming a sorus is in fact a double line forming a double or twin sorus. The name *Scolopendrium* is from *Scolopendra*, a centipede, from some supposed resemblance between the feet of the centipede and the lines of fructification of the Fern. Its English name comes from the likeness of the whole frond to the shape of a Hart's tongue, differing altogether from the generality of its feathery fellows, in being not only one long shining bright green leaf, partially erect when dwarf, but drooping in its larger development, growing in groups or tufts, on rocks, damp masonry, and moist banks, from four inches to upwards of two feet long, hanging down indeed like great tongues lolling over the grey walls or grassy banks.

* *Asplenium Scolopendrium* (*Linnæus*), *Blechnum lingulifolium*, &c.

The dwarf fronds are thick and of a leathery texture, the larger thinner and less rigid; their outline is what is called strap-shaped, that is narrow oblong lanceolate much elongated: they taper toward a point at the apex, and become narrow downwards, cordate (rounded like the thick end of the heart in cards) at the base; the margin is entire, or very slightly wavy; and the stipes is shaggy and about half the length of the leaf. The venation consists of a strong midvein or midrib, extending the whole length of the frond, from which forked veins, their branches parallel and proceeding direct toward the margin, terminating just within it in a club-shaped apex. The veins are usually forked twice, but are not constant to any exact number of divisions. The sori, which are oblong patches of unequal length, lying in the direction of the veins at short intervals along the upper two-thirds of the frond, are composed each of two lines of fructification united at their sides, each of these lines, however, consisting of a complete sorus, so that the two united are properly called a twin sorus. This twin sorus is always produced between two fascicles of veins; that is, the lowermost venule produced by one vein and the uppermost of another below become each a receptacle upon which one of the two contiguous lines of spore-cases is produced. Their indusia are attached on the upper and lower sides of the venules, the other edges overlapping, so that the free margin is outside the fascicle of venules to which it belongs. When very young, the separation where they overlap is not apparent, but becomes so as they

advance towards maturity ; till at last they open down the centre, one indusium turning up and the other down, the two lines of spore-cases becoming confluent and confused.

This is the normal condition of *Scolopendrium* ; but the genus is one of the most remarkably prolific in varieties, and in remarkable varieties, among all known Ferns, the greater part of these, though not unfrequently altogether monstrous, permanent and retaining their peculiarities in cultivation. Several forms very distinct in themselves, and distinct also from the parent have been produced from the spores by artificial treatment, indicating how probably the same process is going on in a state of nature, more slowly perhaps and imperceptibly, but as certainly, giving rise to new forms, some transient, but some to be perpetuated.

The fructification of *Scolopendrium* is, of course, as being one of the *Polypodiaceæ*, normally dorsal ; but in some of its varieties there is a very curious deviation from the law : the sori are produced on the upper as well as the lower surface, and sometimes abundantly so. This occasionally happens from the elongation of the normally-placed sorus on the under side, which extends to the margin and returns on the upper side when the sori are placed opposite the marginal crenatures. But it also frequently happens that the sori are produced on the upper side distinctly within the margin, and where there are no corresponding sori beneath. Those varieties which have the margins toothed (crenated) or lobed seem most liable to assume

this suprasoriferous (bearing-the-sori-on-the-upper-surface) condition.

The Hart's Tongue seems to be pretty generally distributed throughout England, Scotland (more sparingly), Ireland and the Channel Islands, and through most countries in the northern temperate zone. It is not a sea Fern, but prefers the coast neighbourhood in more northern latitudes, ranging to an elevation of some 500 or 600 feet. With all its varieties, it is hardly to be considered a common Fern. It may be easily cultivated, and no Fernery should be without some few at least of its endless changes. Medical virtues have been attributed to it; among others, that of being good for burns and scalds. It is abundant in the limestone districts, and found also here and there upon the slate.

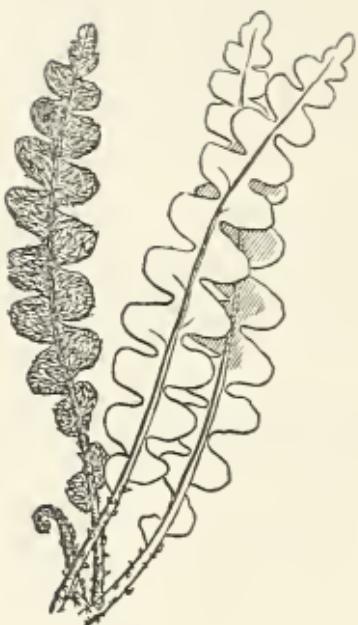
VARIETIES OF SCOLOPENDRUM VULGARE.

NAMES.	BY WHOM NAMED	BY WHOM FOUND	WHERE FOUND	PROMINENT CHARACTER	REMARKS
a l b a - v a r i e g a t u m	Hodgson	Mrs. Hodgson	1871 Urwick Arnside	variegated white and green whole plant cream-coloured	beautiful, quiet constant striking in appearance
a l b e s c e n s	Moore	J. Crossfield	1860	margined and lacinate fronds very narrow, &c.	fronds of many forms a fine variety
b i f o r m e	Wollaston	J. M. Barnes	1862	fronds short, heads large	a densely crested form
b i m a r g i n a t u m	Moore	W. H adwin	1872	apex of fronds like crabs claws	rather inconstant
c a p i t a t u m	Moore	I. Stewardson	1861	frond contracted below a beautiful form crest	
c h e l a f r o n s - m a j u s	Wollaston	J. M. Barnes	1861	frond abrupt, horned margin toothed, crested narrow and crispy	found also by J. Cross-field, Silverdale
c o n t r a c t u m	"	"	1861	Heversham Head	a small growing plant a small but beautiful form
c o r n u t u m	Moore	Mrs. Hodgson	1863	Scales, Ulverston	many distinct forms have been found
c r e n a t o - m u l t i f id u m	Barnes	T. Airey	1860	Birkrig	a very rare variety
c r i s p o - f i s s u m	"	"	1877	Milnthorpe	found in many forms
c r i s p u m	Moore	several		many places	a fine crested form
" s o r i f e r u m	Barnes	A. B. Taylor	1861	Whitbarrow	
c r i s t a t u m	Moore	several		many places	
c r i s t a t a - g a l l i	Wollaston	"		"	
c y m b a f o r m e	"	J. M. Barnes	1861	Whitbarrow	
d i g i t a t u m	Stabler	G. Stabler	"	Cark	a strange sport
d i v a r i c a t u m	"	J. Crossfield		Arnside	venation reticulated
e x c u r r e n s	"	"	1862	Whitbarrow	a splendid variety [face
f i s s u m	"	G. Stabler	1864	Brigstock	pouched and horned
f i s s u m A i r e y i	"	J. M. Barnes	1862	Milnthorpe	fronds narrow
f i l a b e l l a t u m B o l t o n i i	Barnes	T. Airey	1877	near Kellet	narrow, &c.
		W. Bolton	1870		a neat growing form a very fine form shaped

Varieties of *Scolopendrium Vulgare* — continued.

NAMES	BY WHOM NAMED	BY WHOM FOUND	WHERE FOUND	PROMINENT CHARACTER	REMARKS
<i>flavo-variegatum</i>	Barnes	J. Crossfield	near Ulverston	variegated yellow and green	fine while fronds are young
<i>glomeratum</i>	Moore	Miss Nicholson	1865 Storth	ramose and crested	a grand form
<i>imperfectum</i>	Wollaston	G. B. Wollaston	1867 Whitbarrow	fronds defective	wanting in uniformity
<i>incisum</i>	Barries	J. M. Barnes	1861 Levens Park	fronds deeply cut	almost pinnate
<i>infra-nervicatum</i>	Wollaston	,	1863 Arnbarrow	projections on the under surface	a remarkable but not showy variety
<i>laenitatum</i>		several		fronds evenly reduced	a not uncommon form
" <i>crispum</i>	T. Bolton	1865 Wariton Crag		fronds reduced in places	a very fine variety
" <i>cristatum</i>	J. M. Barnes	1862 Brackenthwaite		fronds reduced and crested	a dwarf growing form
" <i>irregularē</i>	"	"	1861 Levens Park	fronds irregularly reduced	a robust but uncomely form
" <i>marginatum</i>	"	"	1865 Heversham Head	fronds reduced and marginated	wanting in uniformity
" <i>spiralē</i>	"	"	1865 Whitbarrow	fronds undulated and twisted	a good variety
<i>lanceolato-supralineatum</i>		T. Alrey	1877 Milnthorpe	line on the surface, &c.	an uncommon form
<i>limbospermum</i>	Moore	J. Crossfield	1860 Broomham Fell	sori on the margin	a rare form
<i>lhuiare</i>	Wollaston	J. M. Barnes	1861 Whitbarrow	fronds very narrow	a bulb-bearing plant
<i>lobatum</i>	Deak	several	many places	fronds once or twice forked	a rather common plant
" <i>densum</i>	Wollaston	J. M. Barnes	1861	fronds thick and undulated.	good in its way
" <i>divergens</i>	Barries	J. K. Hodgson	1864 Heversham	lobes at right angles	cross
<i>longiphlorum</i>	Moore	several	1870 Baycliff Lane	fronds lined on under side	often in the form of a spores naked
<i>marginatum</i>	"	"	many places	margin of frond	a not uncommon sport
" <i>erectatum</i>		J. M. Barnes	1860 Arnside Tower	under-lined and crested	a robust and fine form
" <i>fimbriatum</i>	"	"	1861 Levens Park	fronds narrow	a beautiful variety
<i>undulatum</i>	Barnes	I. Stewardson	1865 Heversham Head	marginated and undulated	a dense, fine form
" <i>venosum</i>	"	"	1874 Flookborough	veins very prominent	

<i>multifidum</i>	<i>lobatum</i>	<i>Gray</i>	<i>J. J. Jones</i>	several	1862	many places	crested	found in various forms
<i>muricatum</i>	"	<i>Moore</i>	<i>Mrs. Hodgson</i>	Farleton Knot	near Gleston	projections on the upper side	crested	a rare form
<i>nodosum</i>	"	<i>Barnes</i>	<i>J. M. Barnes</i>	near Brigscier	Heversham Head	lobate and muricate	a neat and good variety	
<i>polycypris transversum</i>	"	<i>Moore</i>	"	"	near "Holme	frond knee'd	a strange sport	
<i>undosum</i>	<i>Wollaston</i>	<i>Wollaston</i>	<i>1871</i>	1861	near Beetham	crested, &c., &c.	remarkable in its form	
<i>polymorphum</i>	<i>Gray</i>	<i>Gray</i>	<i>1871</i>	1861	Levens Park	crest many-pointed	of crests	
<i>polyschides</i>	<i>Moore</i>	<i>Moore</i>	<i>1895</i>	1862	Warton Crag	fronds of many forms	a fine form	
<i>projectum</i>	"	"	<i>1861</i>	1862	Levens Park	fronds narrow	irregular and uncomely	
<i>ramigerum</i>	"	"	<i>1861</i>	1863	Levens Park	margins of fronds lobed	plant small	
<i>ramo-digitatum</i>	<i>Bolton</i>	<i>T. Bolton</i>	<i>1861</i>	1863	Levens Park	branched and under-lined	a beautiful form	
<i>rimosum</i>	<i>Moore</i>	<i>J. M. Barnes</i>	<i>1862</i>	1862	Levens Park	much branched and	no two fronds alike	
<i>rugoso-marginatum</i>	<i>Wollaston</i>	<i>Wollaston</i>	<i>1862</i>	1862	Levens Park	crested	a very fine form	
<i>sagittatum</i>	<i>Allchin</i>	<i>Allchin</i>	<i>1862</i>	1862	Levens Park	frond of chinks	a moderate form	
<i>udisorum</i>	<i>Barnes</i>	<i>Barnes</i>	<i>1863</i>	1863	Levens Park	frond rough and under-lined	a good variety	
<i>spiralis</i>	<i>Moore</i>	<i>Moore</i>	<i>1864</i>	1864	Levens Park	auricles much enlarged	normal, except the ears	
<i>sculpturatum</i>	"	"	<i>1864</i>	1864	Levens Park	frond thick, point	soni without indusium	
<i>supralineatum</i>	"	"	<i>1864</i>	1864	Levens Park	frond twisted	plant with a crispy	
<i>fimbriatum</i>	"	"	<i>1864</i>	1864	Levens Park	surface of frond carved	aspect	
"	"	"	<i>1864</i>	1864	Levens Park	lined on the upper side	a good and constant var.	
<i>Hartleyi</i>	<i>Barnes</i>	<i>T. Hartley</i>	<i>1876</i>	1876	Kellet	"	from beautifully film-briated	
<i>turgidum</i>	<i>Wollaston</i>	<i>J. M. Barnes</i>	<i>1876</i>	1876	Levens Park	frond thick and rigid	an excellent variety	
<i>multifidum</i>	<i>Barnes</i>	<i>J. M. Barnes</i>	<i>1876</i>	1876	Witherslack	"	rather defective	
<i>undulatum</i>	<i>Moore</i>	<i>J. M. Barnes</i>	<i>1876</i>	1876	Heversham Head	fronds frilled	crested	
<i>multifidum</i>	<i>Wollaston</i>	<i>J. M. Barnes</i>	<i>1876</i>	1876	Witherslack	"	good form	
<i>undulatum</i>	"	"	<i>1876</i>	1876	Levens Park	partly facinante	excellent variety	
<i>multifidum</i>	"	"	<i>1876</i>	1876	Levens Park	fronds one-sided	delicate in habit	
<i>undulatum</i>	"	"	<i>1876</i>	1876	Levensham Head	fronds any shape	a sad deformity	
<i>unilaterale</i>	<i>Barnes</i>	<i>J. Garnett</i>	<i>1876</i>	1876	Furness Abbey	variegated	very variable	
<i>Variable</i>	<i>Capt. Jones</i>	<i>J. Garnett</i>	<i>1876</i>	1876	Arnside	strongly ramo-crystate		
<i>variegatum</i>	<i>Moore</i>	<i>J. Garnett</i>	<i>1876</i>	1876	Kendal	a robust fine form		
<i>Whitwellii</i>	"	<i>G. Whitwell</i>	<i>1873</i>	1873				



THE COMMON SCALE FERN.

THE COMMON SCALE FERN,
OR SCALY SPLEENWORT.

*Asplenium Ceterach.** — LINNÆUS.

Ceterach, the botanical name of this genus (of which there is only one British species), is said to be a corruption of *Chetherak*, the name given to it by Arabian or Persian medical writers. Its old English designation of Milt-wast is said also to be a corruption: the *Milt* being the *Spleen*, and *wast* said to be from *waste*—because of some story of its destroying the spleen,—but more probably, as Bailey puts it in his good old dictionary, “*Milt-wast, wort, Herbs*” (making *wast* the synonym of *wort*, a herb), *Milt-wast* is simply *Spleenwort*, and no corruption at all. It was also called Finger Ferne, “because,” says Turner in his *Herbal* (1551), “it is no longer than a manne’s finger,” and Scale Ferne, “because it is all full of scales in the inner syde.” The Scaly Milt-wast or Spleenwort, growing generally about the size of “a manne’s finger,” sometimes not so large, but sometimes even six or eight inches long, is a tufted ever-

* *Ceterach officinarum* (*Willdenow*), *Scolopendrium Ceterach*, *Gymnogramma Ceterach*, *Blechnum squamosum*, &c.

green, living on the limestone, and lodging, when away from its native rocks, on any old walls or ruins. The stipes is short and scaly ; the fronds are commonly pinnatifid, sometimes pinnate, divided rather more deeply. The upper surface is a deep opaque green ; the under is densely crowded with closely-packed and over-lapping scales, whose rusty brownness, as they project beyond the margin, seen yet more fully in the exposed under-surface of the young partially-developed fronds, contrasts with the deep green of the upper surface. The pinnae or lobes are ovate, either entire or lobed in the margin. The venation is indistinct, on account of the opacity of the thick and fleshy fronds. Indeed, it is only to be made out by examining young fronds, removing the scaly-covering, and the outer skin of the frond itself. It is then seen that the principal vein, entering at the lower corner, proceeds sinuously toward the upper side of the apex, branching alternately, and branching again, the venules becoming more or less joined near the margin. The sori are borne irregularly along the sides of the venules, most of them directed toward the apex of the pinna. At first they are quite hidden by the scales, but ultimately the spore-cases protrude between them, though, being nearly of the same colour, never very obviously.

In old times this plant had a great medicinal reputation. Gerard writes of it :— “ There be empiricks or blinde practitioners of this age who teach that with this herbe not only the hardness and swelling of the spleene, but all infirmities of the liver, may be

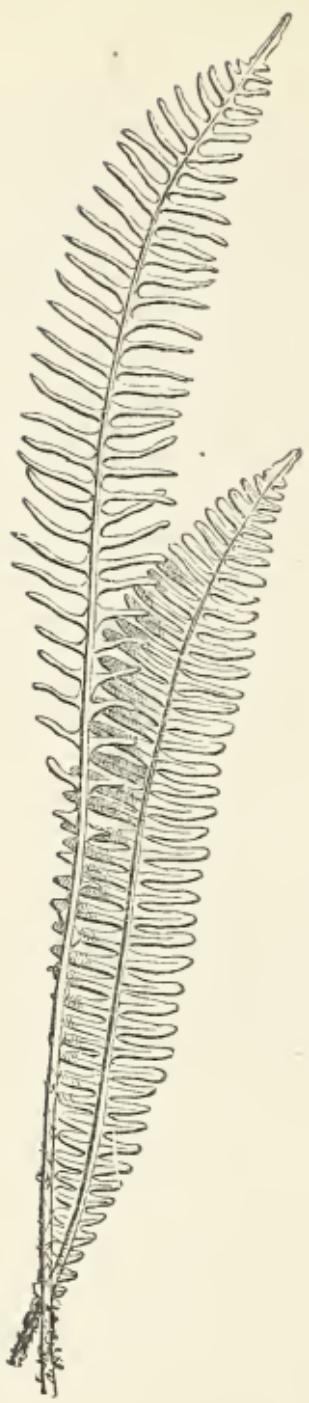
effectually and in a very short time removed. . . . But this is to be reckoned amongst the old wives' fables, and that also which Dioscorides telleth of, touching the gathering of spleenwort, in the night, and other most vaine things which are found here and there scattered in old books." There may be yet some grain of truth in even old wives' fables; and *Ceterach*, though its Arabic name be lost, is still retained in Italy in the list of medicinal plants. On the Welsh coast they use it as a bait in fishing for rock-cod. It does not apparently extend further north than Scotland, but is spread over the centre and south of Europe, North and South Africa, through Central Asia, and, it is said, in Brazil. It grows freely in the garden—in lime-rubbish, requiring to be kept rather dry.

HABITATS.

Arnside Knott (*Miss Beever*) ; Milnthorpe, Scout Scar, Ambleside (*Miss S. Beever*) ; Gosforth, (*Robson*) ; Keswick, Sandwith, St. Bees, Yew Crags, Aira Beck, Whitbarrow, &c.

VARIETIES.

ramosum, — Arnside, J. Crossfield.
crenatum, — In several places.



THE COMMON HARD FERN.

THE COMMON HARD FERN.

*Blechnum Spicant.** — Roth.

Blechnum (a Latinized form of the Greek *Blechnon*) is only a Fern — any kind ; but *Spicant*, erect and spike-like, as an ear of corn, well expresses the peculiar appearance of this plant, with its erect fertile frond standing above the less erected barren fronds around it. The Hard Fern, too, is a no less expressive title, for the plant is hard, rigid and hardy too. It is one of the few English Ferns producing distinct-looking kinds of fronds — fertile and barren. The barren grow in tufts, very gracefully and droopingly disposed, from six to twelve inches high ; and in the centre of them, always higher, and sometimes twice their height, rises the hard upright fertile frond. The barren fronds are attached to the caudex by a very short scaly stipes, the stipes of the fertile frond also scaly : the scales long-pointed and sparse, extend half the length of the whole frond, and of a dark brown. Both kinds are narrow lanceolate, the barren being only deeply pinnatifid, while the fertile are pinnate ; the segments in both are long and narrow, like the teeth of a comb.

* *Osmunda Spicant* (*Linnæus*), *Asplenium Spicant*, *Lomaria Spicant*, *Blechnum boreale*, &c.

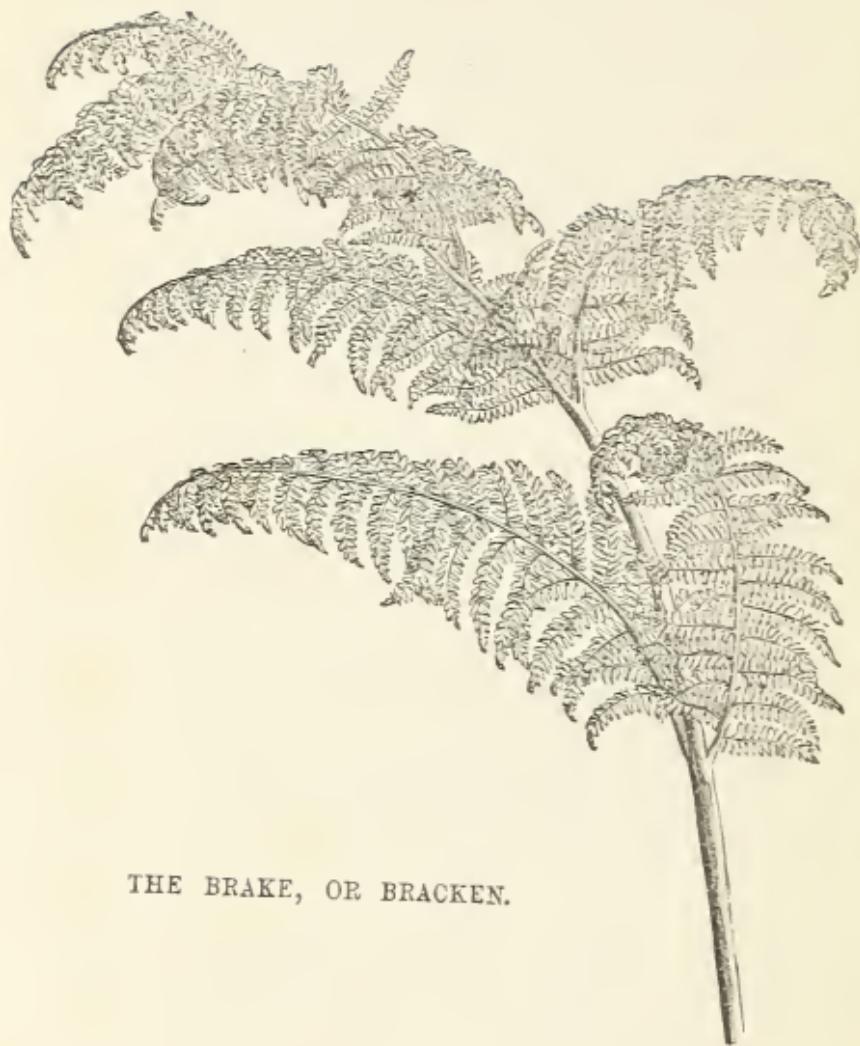
The venation of the barren fronds is distinct, a stout midrib or vein producing lateral veins once or twice forked, the venules extending parallel towards the margin, and terminating in a small club-shaped head. The venation of the fertile frond, not so distinct on account of the contractions of the parts, differs in having a longitudinal venule on each side the midvein, forming the receptacle to which the spore-cases are attached. The spore-cases are arranged in two linear sori, one on each side of the midvein, distinct while young, but often becoming confluent and covering all the under-surface. The indusia, when mature, burst toward the midrib, and become split, here and there, at points opposite some of the venules. The Hard Fern is an evergreen, not large, but strong and very distinct-looking; growing in heaths and rough stony places, in woods and shady bottoms, preferring moisture, but careless of situation, and growing in Cumberland at an elevation of 3,000 feet, in Scotland, a thousand feet above that. From Lapland to the Cape of Good Hope, from Japan to the Azores, from Chili to Brazil, it grows everywhere, and is one of our most common Ferns, yet a very elegant plant, not by any means to be despised because it is hardy and easy of cultivation. Coniston, Ambleside, and Ullswater are named as special places of its inhabiting in this Lake Country.

VARIETIES OF BLECHNUM SPICANT.

NAMES	BY WHOM NAMED	BY WHOM FOUND	WHERE FOUND	PROMINENT CHARACTER	REMARKS
<i>anomalum</i>	Moore	several W. Crouch J. J. Jones T. Airey W. Crouch	many places Rydal Hutton Roof Langdale Loughrigg	fronds all fertile " texture thin and fine reduced, &c. apex of fronds attenuated	common in some places a great rarity well named a strange sport seldom met with
<i>bellum</i>	"	"			
<i>binervio strictum</i>	Sim				
<i>caudatum</i>	Barnes				
<i>condensum</i>	Moore				
<i>congestum</i>	" Barnes	several W. Crouch J. M. Barnes	a few places Wastdale Witherslack	fronds congested, &c, fronds densely leafy lower half of fronds very narrow	in several forms a fine form not at all beautiful
<i>contractum</i>	Moore				
<i>crenatum congestum</i>	Barnes	Wm. Foster	Patterdale	fronds congested, pinnæ a very rare variety ovate & crinate	
<i>crispum</i>	Barnes	"	Langdale	pinnæ broad and undulate	
<i>" Wilsoniae</i>	Wollaston	Mrs. Wilson	Blawith Moor	plant crispy	
<i>crispatum</i>	Barnes	W. Crouch	Wastdale	" "	a fine variety
<i>" Aireyi</i>	"	T. Airey	Orrest Head	fronds crispy	a moderate form
<i>cristatum</i>	Wollaston	J. Huddart	Windermere	heavily crested	a grandly crested form
<i>" Aireyi</i>	Barnes	T. Airey	Orrest Head	crested	a fine form
<i>" gracile</i>	"	W. Crouch	Red Bank	fronds narrow, thin, and crested	delicate and beautiful
<i>dentigerum</i>	Moore	F. Clowes	Windermere	fronds defective	
<i>hetrophyllum</i>	Wollaston	W. Crouch	Wastdale	fronds irregular	
<i>imbricatum</i>	Moore	Mrs. Hodgson	Lake Bank	segments overlapping	" of congestum
<i>lineare</i>	"	J. M. Barnes	Witherslack	fronds very narrow	a remarkable variety
<i>longidactylum</i>	Wollaston	A. B. Taylor	Brigsteer	segments of crests long	a finely crested form
<i>multifidum</i>	Moore	F. Clowes	Windermere	crested	crested
<i>" Hodgsonii</i>	Barnes	J. K. Hodgson	Torver		
<i>multiforme</i>	Wollaston	Mrs. Wilson	Bethcar Moor		
<i>variable</i>	Barnes	T. Hartley	Crook		

Varieties of Blechnum Spicant — continued.

NAMES	BY WHOM NAMED	BY WHOM FOUND	ELD	WHERE FOUND	PROMINENT CHARACTER	REMARKS
					BY WHOM FOUND	
obtuso-multifidum paradoxum	Barnes Capt. Jones	W. Crouch G. Whitwell	1873 1877	Rydal Bansdale	pinnæ short and obtuse a neat crested form three rows of pinnæ a regular fish out of water	
parvileps polydactylum projectum	Barnes Moore	Mrs. Hodgson several	1868	Bonstead Gates many places several	small stellate crests in many different forms	a pretty variety
" Boltonii	" Barnes	T. Bolton	1873	Borwick Moor	pinnæ irregular crested, &c.	
rama-multifidum	Moore	J. Gott	1879	Crook	frond ramose & crested	
rama-multifidum	"	Mrs. Hartley	1864	Crook	ramose and crested	
rano-parviceps	"	T. Airey	1874	Orrest Head	fronds ramose & crested	
revolutum	"	J. M. Barnes	1865	Swindale	pinnæ recurved	
strictum	Francis	several	1880	many places	pinnæ reduced	
Whitwell ramosum	Wollaston	G. Whitwell	1876	Dent	fronds narrow, divided	
semilacerum	Barnes	W. Crouch	1876	Wastdale	fronds ramose, &c.	
"	"	T. Airey	1876	Windermere	very large secondary segments	
semilacerum Gott	Whitwell	J. Gott	1885	Crook	large secondary segments robust & fine variety	
serrulatum	Whitwell	W. Crouch	1876	Wastdale	pinnæ strongly serrulate a pretty variety	
serrulatum Whitwell	"	G. Whitwell	1879	Lambrigg	texture thin, serrulate a neat form	
stricto-conicum	"	J. M. Barnes	1865	Crook	pinnæ of two forms	
" " projectum	Whitwell					
sub-furcatum lanceolatum	"					
sub-serratum	Whitwell					
stricto-conicum	"					
" " " projectum	W. Crouch	1865				
sub-furcatum	T. Airey	1875				
" Crouchii	G. Whitwell	1876				
super-bellum	W. Crouch	1866				
tridactylum	G. Whitwell	1860				
trinervium	Barnes	1864				
" Aireyi	Mrs Hodgson	1863				
" coronans	T. Airey	1865				
	J. M. Barnes	1872				



THE BRAKE, OR BRACKEN.

THE BRAKE, OR BRACKEN.

Pteris aquilina — LINNÆUS.

Pteris is the Greek *pteros*, a feather, applied of old to some kind of Fern, and well applied here,—*Pteris aquilina*, the eagle feather, being doubly applicable to the magnificent, however common, Bracken. *Bracken* is Saxon; it is the female fern of old writers before Linnæus,—not to be confounded with *Thelypteris*, the Feminine Fern, nor with *Filix-fæmina*, the Lady Fern. *Fern* itself is old Saxon also. The Bracken grows everywhere, except on chalk (possibly not getting depth there), and is the commonest of all our Ferns. Over sandy wastes, on hedge banks, in warm moist lanes and woods, it grows abundantly, overtopping the rankest flowers, climbing among the bushes, half supported by them, to a height of from a couple of feet to sometimes eight or ten. The caudex, thick and blackish, is usually creeping just beneath the surface more extensively than that of any other Fern; but in some cases growing straight downwards to a great depth, Mr. Newman stating that he has found it

even fifteen feet below the ground. The fronds appear as soon as the frosts are over, coming up in little curls like shepherds' crooks, or croziers; sometimes like little grey-green downy hooks stuck into the grass, the upper part of the stipes not yet having burst the surface. The young stipes is downy and soft, growing angular and hard in age, spindle-shaped at the base. The fronds, erroneously said sometimes to be three-branched, are truly bipinnate, or tripinnate when very luxuriant, the pinnae standing opposite in pairs, each pair in succession becoming fully developed while the main rachis is extending upward and the next pair is beginning to unfold. It is only when the plant is very poor that the fronds appear three-branched, the development of the lower pair of branches not leaving the plant energy enough to carry up its rachis and produce the other pairs of pinnae which it would normally possess. The true habit of the plant is still more clearly shown when it attains its fullest luxuriance, the full-grown fronds then consisting merely of a series of pairs of branches from bottom to top. The unrolling of the young fronds is very curious, and well worthy of watchful notice.

The bipinnate branches, or pinnae, are in general ovate slightly elongated, their pinnae (the secondary pinnae) narrowly lanceolate. These last are placed rather closely together, and again divided into a series of pinnules, which are either undivided and attached to the rachis by their stalkless base with a line of spore-cases along each margin, or become larger and then more elongated and deeply pinnatifid with the

lines of spore-cases on the margins of the lobes. The apexes of the primary and secondary pinnæ and the pinnatifid pinnules become less and less divided, until at last they end in a single lobe more or less elongate. The venation is very various, depending on these differences of development. Each pinnule has a distinct midvein, producing alternate lateral veins, which become twice forked and extend to the margin, where they meet a longitudinal marginal vein, which forms the receptacle. The indusium consists of a bleached membranous, fringed expansion of the upper skin of the fronds, which turns back so as to cover the spore-cases; but there is here another membrane lying under the spore-cases, no doubt a similar expansion of the skin of the under-surface. The fronds are annual, but owing to their rigid texture do not easily die off altogether, only losing their summer verdure, standing often through the winter, or until bowed by the weight of snow, in all their summer glory of form, and as gloriously beautiful in their varieties of brown as they were in their living greenness.

The Bracken grows everywhere: not only throughout our own islands, but in all parts of the world, from Lapland (at about 67 degrees north) to the Cape of Good Hope. It rises above the coast-level in the Scottish Islands to an elevation of 2,000 feet. It is useful for very many purposes. In our north country the dried fronds make capital litter for cattle; they are also an excellent elastic material for packing and storing fruit in, a fine covering to preserve plants from frost, and make good thatch, employing the stems also.

They are not bad fuel, though light and quick burning; and, cut green, are good manure for land, one third of their bulk, according to Sprengel, consisting of mineral substances, potash, silica, lime, soda, cholrine, magnesia, oxide of iron, phosphoric acid, &c. The dry herbage is said to be rich in nitrogen. They are especially good for manuring potatoes. Good also for feeding pigs, who are fond of the 'roots' (the under-ground caudices), which are succulent and starchy, and who have no objection to a jelly made by boiling the young and tender fronds. Mr. Lees suggests that the same, not made into jelly, but boiled as greens, would not be bad eaten with the pig instead of by him ; and Dr. Clarke recommends them when very young, tender, and blanched, as a substitute for asparagus. The New Zealanders eat the 'roots' of a variety of the Bracken, *P. esculenta*, pounded between stones and roasted ; in Siberia these same stems are used in brewing a kind of beer, one-third fern-root to two-thirds malt ; and the Rev. M. J. Berkeley speaks of bread made from it, 'better to my taste, and probably not less nutritious, than Cassava bread.' These root-stems are also, on account of the quantity of tannin and astringent matter contained in them (which, by the way, would rather interfere with the asparagus flavour), much used abroad in preparing chamois and kid leathers. The alkalic properties of the fronds make them useful too in soap. Farther, the Bracken is not without a medicinal reputation : it is still retained in the *Materia Medica* as a remedy for worms, and a bed of the green plant is looked upon by country folk as 'the sovereign-

est thing on earth' for rickets in children. Common as the plant is there does not seem to be many varieties.

VARIETIES.

crispa,—Arnside, J. M. Barnes.

multifida,—Levens, J. M. Barnes; Windermere, F. Clowes.

variegata,—Windermere, F. Clowes.

cristata,—Langdale, J. M. Barnes.



THE BRITTLE BLADDER FERN.

THE BRITTLE BLADDER FERN.

*Cystopteris fragilis.** — BERNHARDI.

The Bladder Ferns (*kystos* is Greek for *bladder*) are so called because the indusium, even in age inflated or bulged out like a hood, has when young the look of a flask or bladder. The plant differs in this from the flatness (the sori in both being rounded) of the Polystichums and Lastreas with which it was formerly ranked, under the general name of *Aspidiæ*. There are three British species of Bladder Ferns: the Brittle or Fragile—*Cystopteris fragilis*, the Alpine—*C. regia*, and the mountain—*C. Montana*; but only the first is really authenticated as belonging to the Lake Country, no claim being made for *C. Montana*, and the likelihood of *C. regia* depending only on the following paragraph in Moore's last edition:—"We have not seen a native mountain specimen of *C. regia* unless it be one from Saddleback (Blencathra), in Cumberland, gathered many years since by Mr. S. F. Gray." There appears indeed to be only one authenticated habitat of the plant in England: that at Low Leyton, in Essex.

* *Polypodium fragile* (*Linnæus*), *Aspidum fragile*; *Athyrium fragile*, *Asplenium fragillimum*.

The Brittle Bladder Fern is of a very delicate and grassy appearance, the root-stems spreading, under favourable circumstances, into large patches of numerous crowns, each of which throws up a tuft of several fronds, from six inches to sometimes a foot in height. The stipes, erect, and rather more than a third of the length of the frond, is brittle, dark, shining, with a few small scales at the base. The fronds are lanceolate, bipinnate; the pinnae lanceolate; the pinnules ovate-acute, cut more or less deeply on the margin, the lobes furnished with a few pointed teeth. In some vigorous plants the pinnules are so very deeply cut as to become pinnatifid, almost pinnate, the lobes themselves then resembling the smaller pinnules nearer the apex of the pinnae and frond. The venation, from the delicacy of the frond, is very readily seen. In the ordinarily-sized pinnules there is a somewhat twisty mid-vein, giving off a side branch or vein to each of the lobes into which the margin is cut, these veins again branching into two or more venules according to the size of the lobe, and each branch generally bearing a sorus at about midway of its length. The sori are thus generally numerous and rather irregularly placed, often becoming confluent and covering the whole under-surface; but their number, and confluence, varying much, depending upon the various circumstances of growth. The sori are nearly circular; the flask or bladder-shaped (like a hood over them) indusia become in age torn or split at the point into narrow segments, turned back, jagged and fringe-like, the whole being pushed off by the ripening spores.

HABITATS.

Borrowdale (*Miss Wright* and *G. B. Wollaston*), Whitbarrow (*Wollaston*), Egremont (*Robson*), Ullswater (*Wollaston*), Arnside Knott (*H. D. Geldart*), Fairfield, Kendal, Windermere (*Clowes*), Kentmere (*Clowes*), &c.

VARIETIES.

angustata, — Whitbarrow, F. Clowes; Arnside, J. Crossfield; Sizergh, J. M. Barnes.

dentata, — Kentmere, F. Clowes; Arnside, J. Crossfield; Kendal Fell, J. M. Barnes.

cristata, — Sedgwick, J. M. Barnes.

interrupta, — Windermere, J. Huddart. Kendal Fell, G. Whitwell.



THE OBLONG WOODSIA

THE OBLONG WOODSIA.

*Woodsia ilvensis.** — R. BROWN.

The genus *Woodsia* (so called from Mr. Joseph Woods) is the British representative of the group Peranemeæ. Of the two British species, the Oblong Woodsia and the Blunt-leaved or *alpina*, only the first is found in the Lake Country. Even that is very rare. It was first discovered in 1846, in a small quantity, on one of the Westmorland mountains, by Mr. Huddart, who afterwards found some hundred plants near Scafell in Cumberland. The next year other stations were found in Westmorland by Mr. Huddart, both alone and in company with Mr. Clowes. In some of these places were only a few plants, but in one a great many and very fine.

The Oblong Woodsia is especially a mountain Fern, fronds annual, dying down to the ground in winter and coming up again in spring. Its caudex is short, erect or decumbent, furnished with a few scales on the crown, forming tufts, which in favourable circumstances grow into masses rather large in comparison with the diminutive nature of the plant. The stipes

* *Acrostichum ilvense* (*Linnæus*), *Polypodium ilvense*, *Aspidium rufidulum*, *Lastrea rufidula*, &c.

is scaly and articulated, or jointed, at a short distance from the base, so that in age the upper part with the fronds fall away, the lower part still adhering to the caudex. The fronds are seldom more than four inches high, oftener less; their form is lanceolate, varying in breadth, pinnate, the pinnæ usually set on nearly or quite opposite in pairs, obtusely oblong, with the margin deeply lobed or pinnatifid. They are of a thick dull-looking texture, and are more or less clothed on both surfaces, but especially on the veins beneath, with minute bristle-like scales and shining jointed hairs, among which the sori lie almost concealed. The venation of the segments of the pinnæ consists of a rather indistinct midvein, from which the smaller veins, simple or branched, extend to the margin near which the sori are produced. The indusia are peculiar in that they are not placed as covers to the sori, but attached under them. When very young, indeed, they enclose them; but later they split from above into narrow scale-like segments, not easily distinguished without a glass from the frond-hairs among which they lie. In the full-grown state the sori lie in tufts of hair-like scales formed on the torn margins of the indusium, the latter being attached to the frond at the point beneath the capsules. No other native Ferns possess a structure at all approaching to this.

THE FILM FERNS.

THE TUNBRIDGE FILM FERN.

Hymenophyllum Tunbridgense.—SMITH.

The Film Ferns — *Hymenophyllum*, so called from the two Greek words *hymen*—a film or membrane, and *phyllon*—a leaf, belong to the same group (TRICHOMANINEÆ) as the Bristle Ferns — *Trichomanes*. They are all small moss-like plants, the smallest of our native Ferns, distinguished from other (foregoing) Ferns by having their fructification on the margins of the fronds, and from each other by the form and nature of the involucres which surround the fructification. These involucres are deep urn-shaped pits, in which are contained the spore-cases, clustered around hair-like or bristly receptacles, which bristles are indeed the ends of the frond-veins projecting into the urns. In *Hymenophyllum* these bristles are always shorter than the urn; while in *Trichomanes* (a British genus

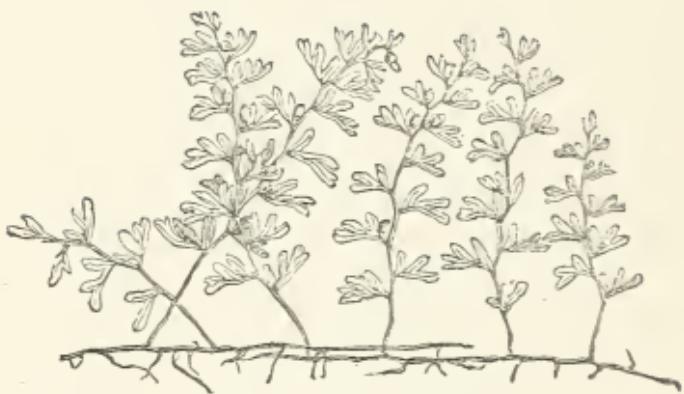
also, but not found in the Lake Country) they project more, so that the fronds become bristly when very full of spores. Hence the name of Bristle Fern. They are known also by the farther difference that the involucres of *Trichomanes* are entire, and those of *Hymenophyllum* split lengthwise into two valves.

The Tunbridge Film Fern (named from its being, first found near Tunbridge, in Kent) grows in matted tufts upon rocks in moist warm places, usually carpeting the damp surfaces of the rocks themselves, but, sometimes choosing the mossy ground, or living moss-like on the trunks of trees — the black wiry rhizomes or creeping caudices interlacing themselves among their neighbour plants. The fronds are very short, from an inch to three or at most six inches long, membranous and half-transparent, almost erect, and of a dull dead-looking brownish-green even when at their freshest; lanceolate or slightly ovate, pinnate, with pinnae pinnatifid or bipinnatifid, and having their branches mostly on the upper side, though sometimes alternately on each side of the pinna. The fronds are virtually a branched series of rigid veins, winged throughout, except on the lower part of the short stipes, by a narrow membranous leafy margin. The sori are produced around the axis of a vein, which, as before said, is continued beyond the frond-margins and enclosed in an urn-shaped indusium, involucre or cover, consisting of two almost perfectly round (orbicular) compressed valves, spinosely serrate on the upper margin. It will grow well in pots in equal parts of peat and silver sand, scarcely caring for any

other mould, but requires a glass, and constant but not stagnant moisture.

HABITATS.

Coniston, Buzzard Rough Crag near Wrynose (*Ray*), Hawl Ghyll near Wastwater (*Robson*), Ennerdale (*J. Dickinson*), Clougha (*J. Stewardson*.)



ONE-SIDED (OR WILSON'S) FILM FERN.

ONE-SIDED (OR WILSON'S) FILM FERN.

Hymenophyllum unilaterale. — WILLDENOW.

In *Hymenophyllum unilaterale* the pinnæ are what is called decurrent in the upper part — that is to say, they are prolonged beyond their points of insertion, as if running downwards, so that the fronds appear to be one-sided, or unilateral. The name of One-sided might therefore be employed to designate it just as well as if not better than the cognomen of its discoverer. Like *H. Trunbridgense*, it grows from numerous slender thready stems, into dense tufts, from which spring a crowded mass of half-drooping brown, green, or olive-coloured, semi-transparent fronds, averaging from three to four inches in height. The fronds are lanceolate and pinnate, the rachis is usually somewhat curved, the pinnæ are one-sided, convex above, and all turned one way, as already described, the outlines of the pinnæ wedge-shaped, digitately pinnatifid (like the fingers of a hand notched almost to the bone). The extreme or ultimate lobes are linear-obtuse with a spinulose-serrated margin. The fronds when luxuriant have a tendency to become branched. The veins are twice-branched, branching

alternately from the rachis, forking again so as to extend the venule to each segment; and after leaving the midrib are furnished with a narrow membranous leafy wing or border (which the rib itself has not). The sori are collected round the free ends of the veins and contained in the urn-shaped covers or involucres, which differ from those of *H. Tunbridgense* in being more or less obviously stalked instead of sessile, and in having their valves entire instead of serrated at the upper margin. Mr. Clowes notices also a farther difference between the species: that the fronds of *H. Tunbridgense* are annual, "never grow more than one year;" while those of *H. unilaterale* are perennial, lasting for several years and annually renewing their growth, bearing spores year after year.

HABITATS.

Patterdale, Ambleside (*J. Bowerbank*); Stock Gill (*Miss Beever*); Dungeon Gill, Scafell, (Black Rocks and Great End), Bowfell, Ennerdale (*Dr. Dickinson*); Scale Force (*H. C. Watson*); Honister Crag (*Rev. G. Pinder*); Gatesgarth Dale, Borrowdale, Lodore (*Miss Wright*); Keswick, near Hawkshead (*Miss S. Cowburn*); Coniston Old Man, Silverdale (*Miss Beever*); Dalegarth (*Robson*); High Stile (*Pinder*).

THE
ROYAL, OR FLOWERING FERN.

Osmunda regalis. — LINNÆUS.

“At Loch Tyne dwelt the waterman, old Osmund. Fairest among maidens was the daughter of Osmund the waterman. Her light-brown hair and glowing cheek told of her Saxon origin, and her light steps bounded over the green turf like a young fawn in his native glades. Often in the stillness of a summer’s even, did the mother and the fair-haired child sit beside the lake, to watch the dripping and the flashing of the father’s oars as he skimmed right merrily towards them over the deep blue waters. Sounds, as of hasty steps, were heard one day, and presently a company of fugitives told with breathless haste that the cruel Danes were making way towards the ferry. Osmund heard them with fear. Suddenly the shouts of furious men came remotely on the ear. The fugitives rushed on. Osmund stood for a moment; then snatching up his oars he rowed his trembling wife and fair child to a small island covered with the great Osmund Royal, and helping them to land, bade them to lie down beneath the tall Ferns. Scarcely had the

ferryman returned to his cottage, when a company of Danes rushed in ; but they hurt him not, for they knew that he could do them service. During the day and night did Osmund row backwards and forwards across the river (or the lake ?), ferrying troops of those fierce men. When the last company was put on shore, Osmund, kneeling besides the river's bank, returned heartfelt thanks to Heaven for the preservation of his wife and child. Often in after-years did Osmund speak of that day's peril ; and his fair child, grown up to womanhood, called the tall Fern by her father's name." So says the heart-thrilling legend, touching, in its conclusion, even to the scientific botanist, accounting for the name of the stateliest of our Ferns. There is another supposition, however, that the name is derived from *os* and *mund*, Saxon words for *house* and *strength* or *peace*, though what house-strength or house-peace has to do with the Flowering Fern it is difficult to say. Why not even a third guess, hardly likely to be farther off than the others, that it has something to do with *Osmonds* — in old Saxon *iron ore*, for it is not found in the iron countries, in Durham and in South Wales, and in our own iron district of Cumberland, if not nearer than Loch Tyne and the river of the ferryman ? Whatever the origin, however, of the name given it by Linnaeus, the Royal Osmund is indeed the grandest of our Ferns, under all circumstances a handsome plant, but especially beautiful when, in very luxuriant growth, its fronds, loaded at their tips by the fertile panicles, are bent down gracefully until they almost reach the sur-

face of the water by the side of which they prefer to grow. From these panicles, springing like clusters of flowers from the ends of the fronds, comes its name of Flowering Fern.

The fronds of the Flowering Fern grow to an average height of three or four feet, sometimes even to the royal stature of eight, ten, or twelve, and six feet or more across. The caudex is tufted, in very old and vigorous plants forming a trunk a foot or more above the ground, from the crown of which, whether it is close to the ground or elevated, grow the fronds. When young, these fronds have generally a reddish stipes, with a bloomy surface, the bloom being lost at a later period. They are annual, perishing before the coming of winter, smooth and of a bright yellow green, paler beneath, lanceolate in general outline when mature, bipinnate, the pinnæ lanceolate or ovate-lanceolate, with pinnules oblong-ovate, somewhat auricled at the base, especially on the posterior side, bluntish at the apex, and finely serrated along the margin. Some of the fronds are entirely barren, while others have several of the upper pinnæ transformed into terminal fertile panicles. Each short spike-like branch of the panicels (or flower-cluster) represents one of the pinnules, the spore-cases being collected on it in little knots, more or less evident, these knots (or nodules) corresponding to the fascicles of the veins. This is very plainly seen in partially-transformed pinnules. The venation, as seen in the barren fronds, consists of a stout midvein giving off nearly opposite veins, which are forked once near their base, the

venules being parallel, slightly curved, and once or twice forked before reaching the margin, where they are lost. In the fertile parts of the frond only the midrib of the pinnules is fully developed, and the spore-cases are attached to a small portion of the veins, which become developed just to serve as a receptacle. The spore-cases are of a reddish-brown, nearly globe-shaped, shortly stalked, reticulated, and two-valved, the valves opening vertically.

The Flowering Fern grows naturally in wet or boggy places, not much above the sea-level in England, and sometimes on the sea-shore hardly above high-water mark. It is common throughout Europe; is found in Asia, in Mingrelia, and in India; in North and South Africa, in the Azores, and in Madagascar; and in North and South America, in Canada and Newfoundland, the United States, Mexico, and Brazil. It is of easy culture, needing only moisture and a peaty soil in any sheltered situation. The caudex is said to possess tonic and styptic properties; according to Gerard, the "root" boiled or stamped, and taken with some kind of liquor, is "thought to be good for those that are wounded, dry-beaten, and bruized." In Cumberland and Westmorland, and that adjoining part of Lancashire which should be Westmorland also, it is known as the "bog-onion," and held in esteem as an external application for bruizes, sprains &c. The caudices are beaten, covered with cold spring water, and allowed to macerate all night; the thick starchy fluid thus formed being used to bathe the parts affected.

HABITATS.

Windermere (*T. G. Rylands*) ; Loughrigg and Skelwith, Colwith (*H. Fordham*) ; Ullock Moss by Keswick, Whitbarrow, Scale Hill, Egremont, Seascale and Gosforth (*Robson*) ; Irton, Millom, Brantwood by Coniston, Yewdale under Coniston Crags.





THE COMMON MOONWORT.

THE COMMON MOONWORT.

Botrychium Lunaria. — SWARTZ.*

The Common Moonwort (a *Botrichium*, of the order OPHIOGLOSSACEÆ, distinguished from all the Polypodiaceæ or True Ferns, by their young fronds being not circinate, but folded straightly, though at the same time resembling the Osmundineæ in having no elastic ring and in being two-valved) is one step farther in the course of natural variety, for, as through Polypodiaceæ and Trichomanineæ there is one regular progression and change of method of fructification from the spore-cases without indusium to the spore-cases with indusium, from the simplest forms of indusia to the flask or bladder shapes, from the spore-cases on the backs to the spore-cases on the margins, and the spore-cases (as in *Osmunda*) on the ends of fronds transformed into seeming stalks, so the Ophioglossaceæ show yet one more change, the change into the appearance of a distinct flower-stalk being yet more marked, so much so as to be not at first sight distinguished from the stalk of a veritable flowering plant.

* *Osmunda Lunaria* (*Linnæus*), *Ophioglossum pennatum*, &c.

Of the OPHIOGLOSSACEÆ there are two British genera — *Botrychium* or Moonwort, and *Ophioglossum* or Adder's Tongue, readily known from each other by their external features. Both genera have two-branched fronds, one branch looking like the leaf and the other like the flower; but they differ obviously in this, that *Botrichium* has its branches branched again, while those of *Ophioglossum* are simple and undivided.

The roots and caudex (or root-stem) of *Botrychium* differ essentially, says Mr. Newman, from those of the "True" Ferns. "The roots are stout, succulent, and brittle. The caudex is about the same size as the roots, perhaps rather stouter; it descends perpendicularly, and the roots issue from it at right angles. Before the plant has felt the influence of spring, the frond exists in a quiescent state, but perfectly formed. It then appears like a simple stem, scarcely an inch in length, and perfectly erect. On a closer inspection the component parts of the future frond will be clearly perceived; the stipes is swollen, and rather stouter than the upper part, the two branches of which face each other, the fertile branch of the frond being clasped by the barren or leafy part; and the fructification being thus entirely concealed, the uppermost pinnæ are incurved, as if to give still farther protection to the fruit. The whole is invested and completely enclosed in scale-like alternate sheaths, doubtless the decaying stalks of many previous years. As the spring advances, the frond rapidly increases in size, until in April it makes its appearance above ground, and in

May or June attains its perfect development."* Mr. Newman also found the frond in the ensuing year in every respect perfectly formed, indeed, exactly in the state in which it is found in the early spring before development; while the frond for the next following year, though less perfectly formed, also had the fruitful and leafy portions distinct from each other. These observations being made in May, while the plant was still growing, the fronds of three successive years were distinguishable at the same time.

The name *botrychium* is from the Greek *botrys*—a cluster, because of the likeness of the branched clusters of spore-cases to the form of a bunch or cluster of grapes. The English name of Moonwort is given on account of the lunate (or crescent-like) form of the pinnæ in the British species.

The Common Moonwort prefers dry, open, and elevated pastures and waste lands, and likes to skirt them under the shade of hedge-rows. It may easily be passed over, half hidden as it is among the herbage, for its height only varies from some two or three inches to six or eight; but once seen there is no mistaking the double row of fan-shaped pinnæ which form its sterile branch. The lower half of the plant consists of a smooth, erect, cylindrical, hollow stipes, whose base is clothed by the brown membranous sheath which had covered it while in bud. Above are the two separate branches of the frond,—one branch spreading, leafy, oblong, pinnate, with its crest-shaped

* Newman's *History of British Ferns*, third edition.

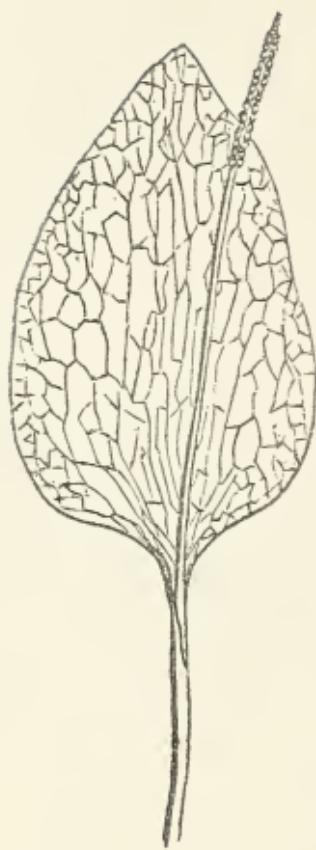
or fan-shaped pinnæ filled with a radiating series of twice or thrice-forked veins, one vein extending into each of the rounded teeth or lobes into which the margin is divided,—the other branch erect, fertile, compoundly branched, that is first divided into branches like the pinnæ then again into further branches, on which, distinct, but clustered, the grape-like stalkless spore-cases, are produced. The spore-cases are two-valved, and open transversely when ripe. The valves are concave. Occasionally, but very rarely, there are two branches: and the variety has the pinnæ pinnatifid.

The Moonwort is widely but sparsely scattered over the British Isles; and is found also in all quarters of the globe, including Tasmania and the Australian Alps in Victoria. It ranges from the sea-line to 3,000 feet above it. It has not generally been very successfully cultivated; but it seems may be, if taken up with a sufficiently large sod, and carefully kept cool and equally moistened. Even in the natural state it is unable to bear much drought.

HABITATS.

Keswick, near Aspatria (Rev. J. Dodd), Braystones, Muncaster Fells, Furness Fells above Coniston Water.





THE COMMON ADDER'S TONGUE.

THE
COMMON ADDER'S TONGUE.

Ophioglossum vulgatum. — LINNÆUS.

The genus *Ophioglossum* (Adder's Tongue, from the Greek *Ophios*—a serpent or adder, and *glossa*—a tongue) is the type of the order Ophioglossaceæ, mentioned before as differing from the True Ferns in having ringless spore-cases and their spring fronds straightly folded. It differs from *Botrychium* in having the branches of its two fronds quite simple or undivided, instead of being pinnate and bipinnate as that is. It differs yet more markedly in that its fertile branches are not merely the branched panicles of *Botrychium*, but distinct spikes in which the spore-cases are distichous (arranged in two rows opposite to each other), like the florets of many grapes. Yet a third remarkable difference is noteworthy — that while in *Botrychium*, as already seen, the next year's fronds are found within the bases of the growing stems, in *Ophioglossum* a bud is developed by the side of this year's frond.

There are two British species of *Ophioglossum* — the Common Adder's Tongue — *O. vulgatum*, and the Dwarf — *O. Lusitanicum*, the last only recently found in Guernsey. The Common Adder's Tongue is very widely dispersed, and abundant where it occurs. The only locality given for it in the Lake Country is in the meadows by St. Bees. It is scattered over the whole of Europe and Asia, North America, and Mexico, and found in some of its varieties at the Cape of Good Hope, in New Zealand, and Australia.

The Common Adder's Tongue is small and stemless, the stem only represented by the central crown of its few coarse brittle roots. The young fronds, from six to twelve inches high, are produced in May and perish by the end of the summer. The stipes is variable in length, smooth, round, hollow, and succulent. The upper part is divided into branches — one branch leafy, entire, smooth, obtusely egg-shaped and slightly variable in form, traversed by irregular-angled veins forming elongated meshes within which are smaller veinlets, — the other branch erect, contracted for about half its length, forming a linear slightly tapering spike, in the substance of which, upon each of its two opposite sides, a line of crowded spore-cases is imbedded. The spore-cases are therefore considered to be produced on the margin of a contracted frond. When ripe, the margin splits at intervals corresponding with the centre of each spore-case, so that the spike then resembles a double row of gaping spherical cavities.

The leaves, pounded in a mortar, are said to yield

"a most excellent greene oyle, or rather a balsame for greene wounds, comparable to oily of St. John's-Wort, if it do not farre surpassee it." The plant prefers loamy pastures and meadow land, where its abundance, disliked by the cattle, by no means improves the grass. It is readily cultivable, but likes the shades of surrounding herbage.



A. TRICHOMANES.

var. incisum.

MEANINGS OF NAMES & TERMS.

ALLOSORUS CRISPUS —

allos — Greek, differing ; *sorus* — Latin, from *soros* — Greek, a heap.

crispus — Latin, crisped, like parsley.

ASPIDIUM — L. — from *aspidion*, — G., a shield.

ASPLENIUM ADIANTUM-NIGRUM —

Asplenium — L. from *asplenion* — G., spleenwort.

adiantum — L. from *adiantos* — G., dry ; and *nigrum* — L., black.

— *germanicum* — L., alternate.

— *marinum* L., marine.

— *Ruta* — L., rue ; *muraria* — L., growing on walls.

— *septentrionale* — L., northern (from the seven stars in the Great Bear).

— *Trichomanes* — G., a hair or bristle ; and *manos*, soft, thin, porous, — or *mania*, excess.

— *viride* L., green.

ATHYRIUM FILIX-FŒMINA —

Athyrium — L. from *athyros* — G., open (from the opening of the indusium).

Filix — L., a fern ; *fœmina* — L., feminine.

BLECHNUM SPICANT —

Blechnum — L. *blechnon* — G., a fern.

spicant — L., spiked, growing to a point like a spike.

BOTRYCHIUM LUNARIA —

Botrychium — L., *botrys* — G., a bunch or cluster of grapes.

Lunaria—*L.*, lunar, lunate (referring to the crescent-like shape of the pinnæ).

CETERACH OFFICINARUM —

Ceterach, corruption of *Chetherak*, Arabic or Persic (meaning not known).

officinarum of *officina* — *L.*, officinal (used in medicine).

CYSTOPTERIS FRAGILIS —

kystos — *G.*, a bladder ; *pteris* — *G.*, a fern.

fragilis — *L.*, fragile, brittle.

HYMENOPHYLLUM UNILATERALE —

hymen — *G.*, a membrane or film., *phyllon* — *G.*, a leaf.

unilaterale — *L.*, one-sided.

LASTREA ÆMULA —

Lastrea, the Latinized name of M. de Lastre.

æmula — *L.*, emulating, rivalling.

— *cristata* — *L.*, crested.

— *dilatata* — *L.*, dilated, spread out, broad.

— *Filix-mas* — *L.*, *filix*, fern ; *mas*, male or masculine.

— *montana* — *L.*, mountain-growing.

— *remota* — *L.*, remote.

— *rigida* — *L.*, rigid.

— *spinulosa* — *L.*, spinulous, prickly-toothed.

— *Thelypteris* — *G.*, *thelys*, feminine ; *pteris*, a fern.

OPHIOGLOSSUM VULGATUM —

ophios — *G.*, a serpent or adder ; *glossa* — *G.*, a tongue.

vulgatum — *L.*, common.

OSMUNDA REGALIS —

Osmunda; derivation and meaning unknown.

regalis — *L.*, royal.

POLYPODIUM CALCAREUM —

polys — *G.*, many ; *pous* — *G.*, a foot : many-footed.

calcareum — *L.*, chalky, limestone-growing.

— *Dryopteris* — *G.*, *dryos*, an oak ; *pteris*, a fern.

— *Phegopteris* — *G.*, *phegos*, a beech ; *pteris* a fern.

— *vulgare* — *L.*, vulgar, common.

POLYSTICHUM ACULEATUM — .

polys — *G.*, many ; *stichos* — *G.*, order (from the numerous orderly sori).

aculeatum — *L.*, prickly.

— *angulare* — *L.*, angular.

— *lonchitis* — *L.*, a spleenwort.

PTERIS AQUILINA —

Pteris — *G.*, a fern, from *pteron* — *G.*, a feather.

aquilina — *L.*, eagle-like.

SCOLOPENDRIUM, from *Scolopendra*, the scientific name of a centipede.

WOODSIA ILVENSIS —

Woodsia, Latinized from the name J. Woods.

Ilvensis — *L.*, Elban, from the island Ilva, Elva or Elba.

acrogenous, — growing chiefly from the extremity.

acuminate, — extended into an acute terminal angle,

appressed, — pressed close, lying near the stem.

aristate, — bearded.

articulated, — jointed, separating readily at the joint.

auricle, — a small ear-like lobe.

caudate — with a tail ; *ovate-caudate*, an egg with a tail, like a tadpole.

caudex (plural *caudices*), — the root-stalk or stem.

circinate, — rolled down, like a crozier-head.

confluent, — running into or uniting with one another.

cordate, — having lobes like the thick end of the heart in a pack of cards.

cotyledons, — the seed-lobes, the first leaves in the rudimentary plant or embryo.

crenate, — having the edges round-toothed.

crenulate, — with smaller teeth.

cruciform, — in the form of a cross.

deciduous, — falling off, as the leaves of annuals.

decumbent, — reclining upon the earth and rising again from it.
decurrent, — prolonged beyond the point of insertion as if running downwards.

deflected (deflexed), — bent downwards.

deltoid, — triangular, like the Greek letter D — delta.

dentate, — toothed.

dicotyledonous, — having two cotyledons.

distichous, — in two rows.

dorsal, — placed upon the back.

dorsiferous, — bearing on the back.

echinate, — prickly, like a hedgehog.

endogenous, — growing from within — increasing by internal growth.

exogenous, — growing from without — by additions to the outer parts of the stem.

fascicle, — a bundle, as of larch leaves growing from a common point.

frond, — the combination of leaf and stem in ferns, &c.

glaucous, — bloom-covered, like a plum or cabbage leaf.

herbaceous, — herb-like.

hippocrateiform, — horseshoe-shaped.

*indusium (plurul *indusia*)*, — the membranous covering of the spore-cases.

involute, — a sort of calyx or ring enclosing an aggregate of flowers.

involucriform, — divided at the margin into hair-like incurved segments.

involute, — having the edges rolled in on each side.

lanceolate, — lance-shaped.

linear, — lying in lines ; also narrow, with parallel margins.

lobes, — the divisions or segments of a leaf ; *lobules*, smaller lobes.

lunate, — crescent-shaped.

monocotyledonous, — having only one cotyledon.

mucronate, — abruptly terminating in a hard short spine.

mucronulate, — not so distinct a spine.

nodule, — a knot.

orbicular, — perfectly circular.
ovate, — egg-shaped ; *obovate*, — inversely egg-shaped.
panicle, — a cluster of flowers.
paniculate, — having panicles.
peltate, — fixed to the stalk by the centre, or by some point distinctly within the margin.
persistent, — lasting, not deciduous.
petiole, — the stalk of a leaf.
pinnia (plural *pinnæ*), — the leaflet or primary division of a pinnated leaf.
pinnate, — when simple leaflet (or *pinnæ*) are arranged on each side of a common leaf-stalk ; *bipinnate*, when the *pinnæ* are again divided ; *tripinnate*, a third division.
pinnatifid, — divided not quite to the stalk.
pinnule, — a small pinna — the secondary division of the leaf.
plicate, — folded lengthwise, like a lady's fan.
plumule, — the bud of a seed.
rachis (plural *rachides*), — the midrib or vein of a leaf or frond.
radicle, — the first root of a plant.
receptacle, — the part in which the organs of reproduction are placed.
reflexed — curved very much backwards.
reniform, — kidney-shaped.
reticulated, — like net-work.
rhizome, — the creeping root-stalk.
rupestral, — growing in rocky places.
serrated, — with teeth like a saw.
sessile, — set on without any perceptible stalk.
soriferous, — bearing sori.
sorus (plural *sori*), — a cluster of spore-cases.
spicate, — in the form of a spike.
spinulose, — having spines or thorns.
spores, — the seeds of ferns.
stipes, — the proper stalk of the fern.
sub, — in composition means nearly, as *sub-ovate*, nearly egg-shaped ; *sub-pinnate*, not altogether pinnate.

subnate, — under-growing.

suprasoriferous, — bearing the sori on the upper surface.

truncate, — terminating abruptly, as if a piece had been cut off.

tuberculate. — lumpy, wart-like.

venation, — the system of veins.

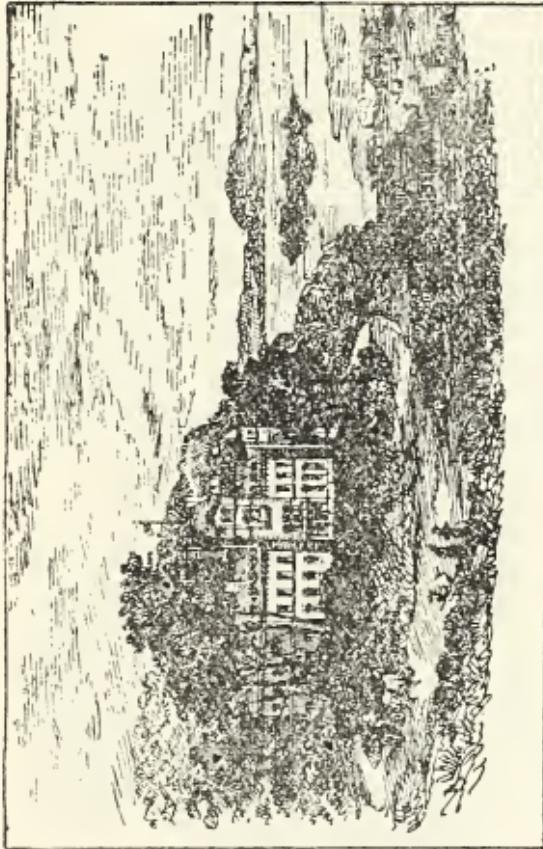
venules, — veinlets or small veins.

whole-coloured — all of one colour.

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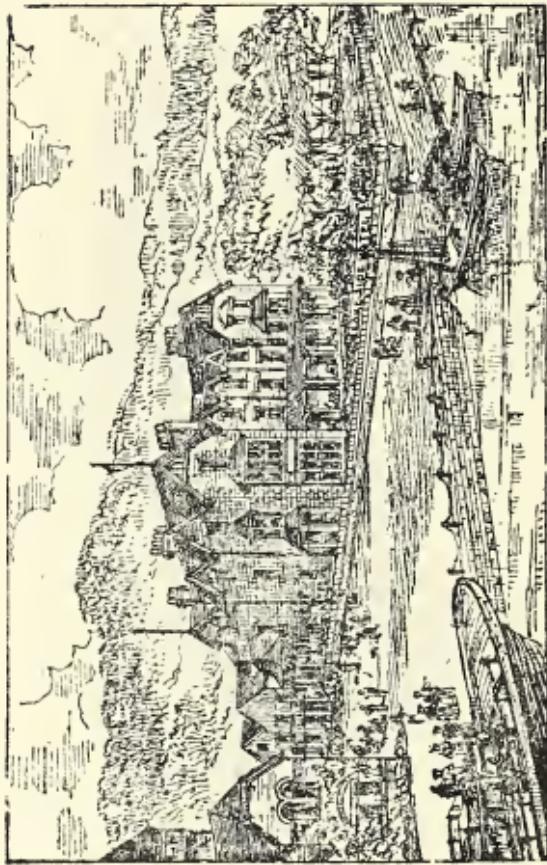
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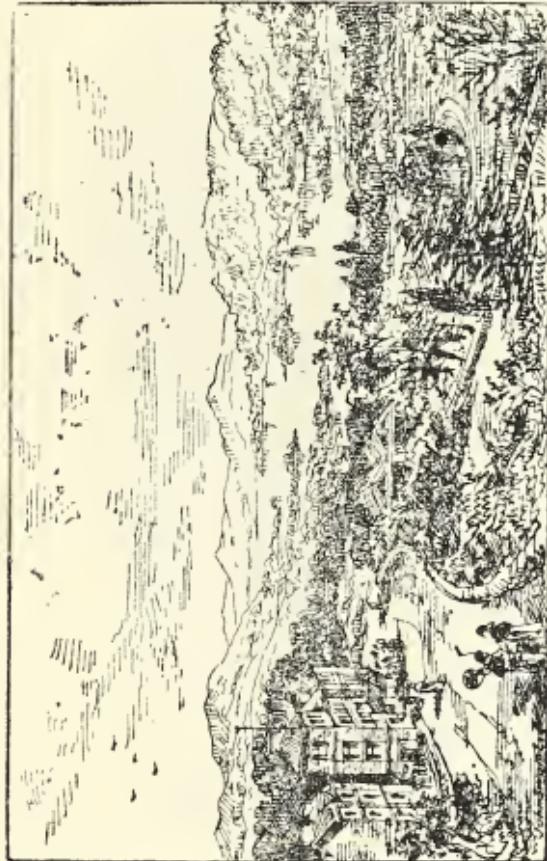
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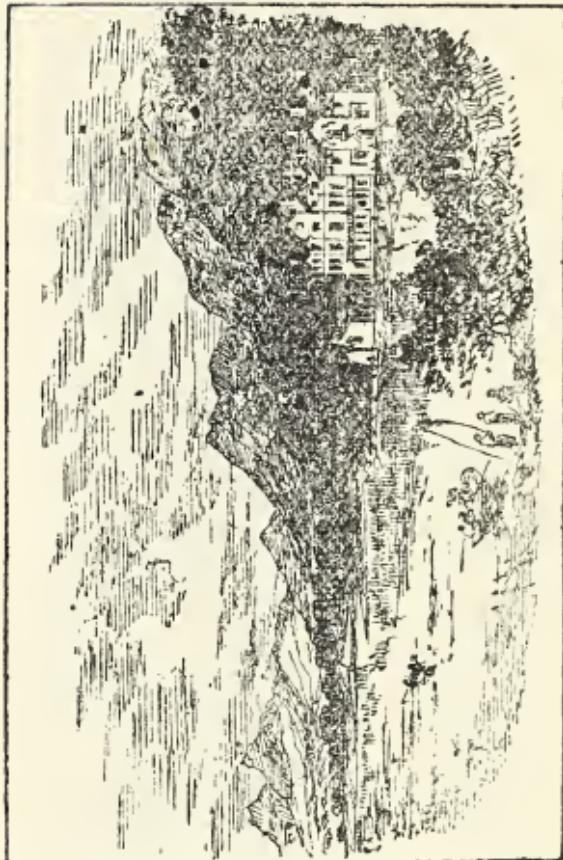
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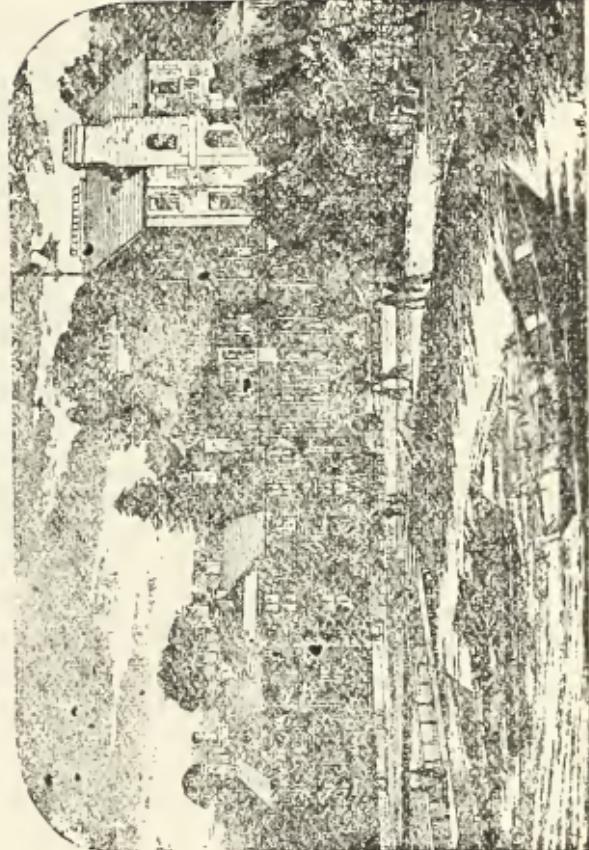
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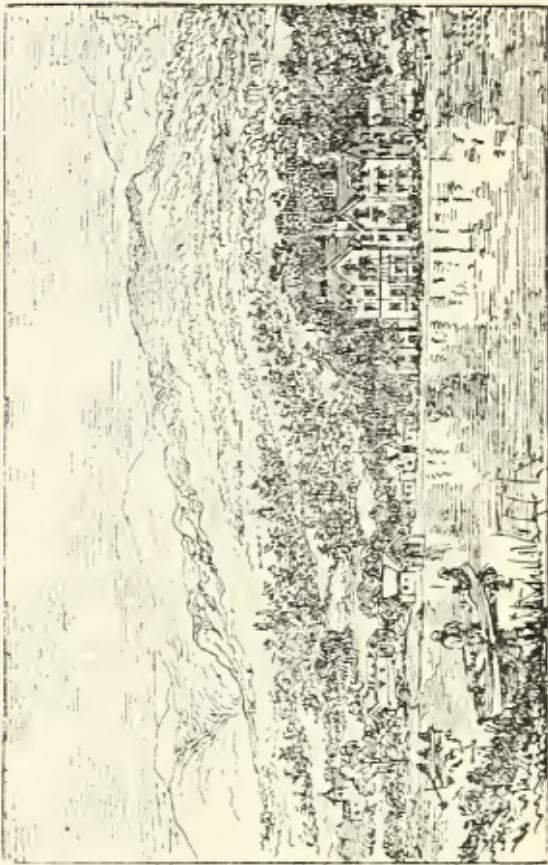
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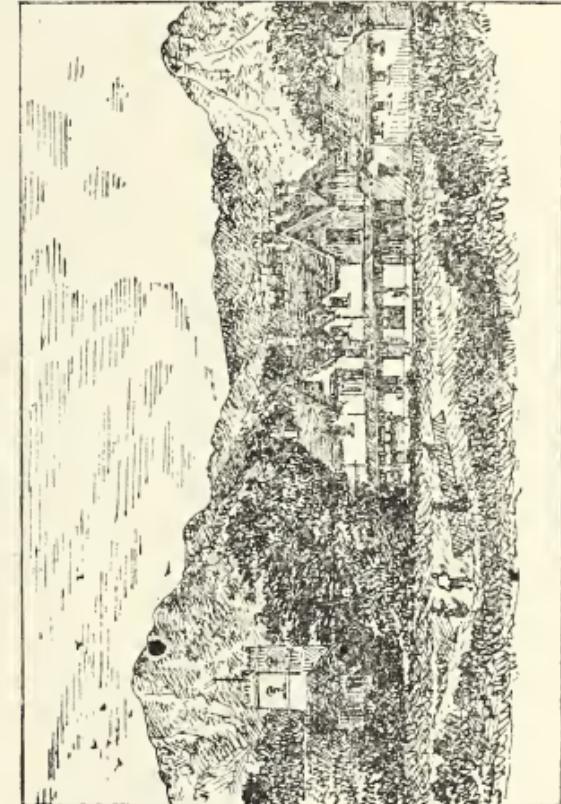
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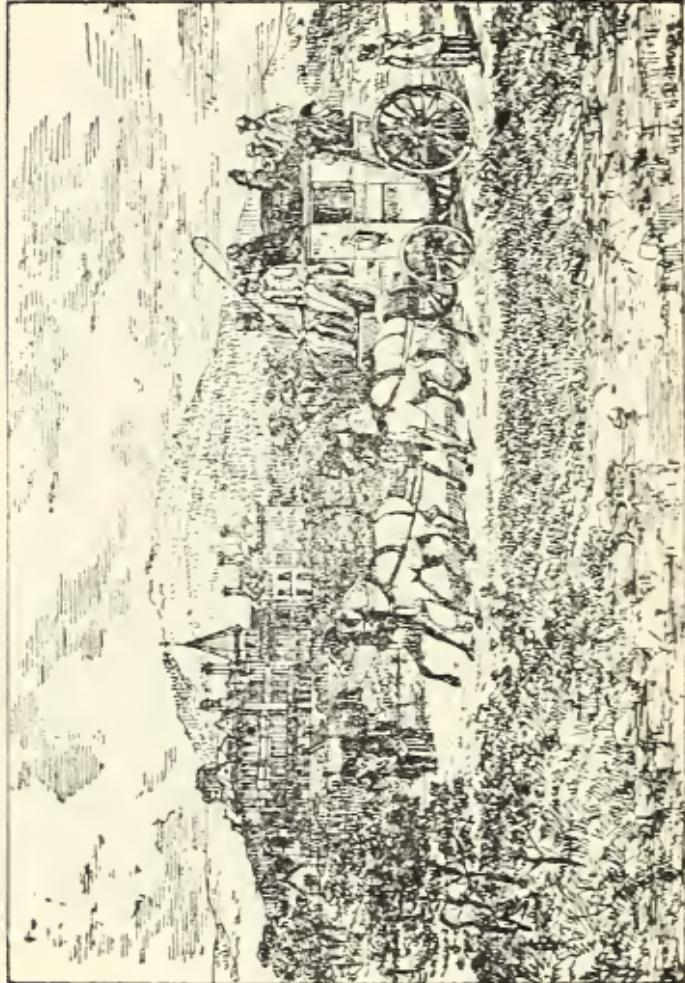
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